

Effectiveness of Buyers' Specific Investment on Improving Smallholder Farmers' Performance: A Case of Cotton Smallholder Farmers in Simiyu Region of Tanzania

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Abstract

This study examined the relationship between cotton buyers' specific investment and cotton smallholder farmers' performance. Literature review on Transaction Cost Theory led to formulation of the research model and hypothesis in order to test the proposed relationship between cotton buyers' specific investment as well as cotton smallholder farmers' performance. Data from a survey of one hundred thirty two (132) cotton smallholder farmers of Tanzania in Simiyu region were used.

Ordinary Least Square method through SPSS was used to estimate results of the model and assumptions underlying regression analysis were observed. Empirical findings revealed that cotton buyers' specific investment has a significant positive relationship with cotton smallholder farmers' performance. This re-enforces that cotton buyers should put more efforts on developing smallholder farmers of cotton in order to improve their performance. Such investment could be providing training and education, providing seeds, storage equipment and transportation facilities after harvesting.

Keywords: *Buyers, Smallholder farmers, Specific Investment and Performance.*

Introduction

Cotton production in Africa is relatively input-intensive and small farmers often do not have access to credit or inputs by themselves due

to market imperfections and vertical coordination widely promoted in cotton supply chains (Delpeuch and Vandeplass, 2011). This implies that cotton gins engage in input provision on credit to their suppliers at the condition that they can secure returns to such investment through an enforceable buy-back agreement (Delpeuch and Vandeplass, 2011). In sub Saharan Africa, governments have been intervening in cotton supply chain on levels of output procurement, input provision, price setting, restriction of private competition and investment on agricultural research (Delpeuch and Vandeplass, 2011).

Most cotton in Tanzania is cultivated in the Western regions whereby Simiyu region accounts for 40 percent of the total seed cotton production (Mwinuka & Maro, 2013). Cotton production is mainly dominated by small holder farmers with an average size of 0.6 hectares (Kiishweko, 2011). Between 1964 and 1995, Tanzania cotton marketing was monopolized by cooperatives and market boards whereby private sector entities were kept at a distance (Delpeuch and Vandeplass, 2011). However, in 1995, the private sector was allowed to enter into cotton processing and distribution (Poulton, 2009). Due to its strategic importance in the country, the sub-sector has attracted the interest of policy makers and other stakeholders.

There have been shifts in policy instruments and other sectoral reforms over time since commencement of the cash crop production in Tanzania by 1904. Such reforms have impacted on the cotton business in terms of pre-harvest and post-harvest challenges. Currently, the cotton sub-sector has several challenges both at the pre- and the post-harvest stages. At the pre-harvest stage, farmers face a challenge supply of unreliable quality of inputs such as seeds, fertilizers and pesticides thereby affecting their productivity significantly.

Tanzania investment in cotton production can be traced back since 1995 whereby the government set up the Agricultural Input Trust Fund to stimulate private trader involvement in input supply and to finance purchases by the cooperative unions (Gibbon, 1999). The fund provided credit at subsidized rates. However, during 1999/2000 marketing season, the Cotton Marketing Board established the Cotton

Development Fund. Under that season, 3 percent levy on cotton exports was paid into a trust fund used to finance purchases of cotton seed (1.35 percent), chemicals (1.15 percent), and research and development (0.5 percent). The inputs were distributed to registered cotton producers at below market prices, with the fund making up the difference. However, it was alleged that corruption was pervasive in the distribution chain and that substantial quantities of chemicals were diverted to the free market (Baffes, 2002). Currently, there is no any subsidy provided to cotton farmers, an aspect, which forces farmers to pay for their seeds and chemicals from the free market.

Recently, the government and other cotton stakeholders have put considerable efforts in improving the volume of cotton sold by farmers to traders - exporters (International Trade Centre, 2011). This is a remarkable initiative because it addresses improvement in cotton production, but more has to be done to improve the overall farmers' and other stakeholders' welfare in this sub-sector. Thus far, cotton investment in cotton production, which has to do with cotton quality and productivity, has missed a policy implication.

If well invested in agriculture, smallholder farmers will be able to produce 1.3 to 1.5 metric tons per annum for each hectare (PASS Trust Report, 2013). Recently, the statistics showed that each hectare can produce 1.2 metric tons per year (MOAFSC Statistics, 2011/2012). It has been reported that failure to stretch production capacity, use of traditional equipment and lack of seed varieties are some sources that hinder small holder farmers' performance (PASS Trust Report, 2013).

This study focused on improving smallholder farmers' performance by finding the best ways of organizing cotton production between buying organizations and growers. Thus, this study was tailored to examine effectiveness of buyer specific investments on cotton smallholder farmers' performance. The output of this study will give focus on areas to increase specific investment and hence, improve cotton smallholder farmers' performance.

Theoretical Perspective

Transaction Cost Analysis (TCA) provides the best way of organizing (governing) transactions between buyers and suppliers so as to enhance effective and efficient performance of the relationship, namely, Buyer to Supplier Relationship (Heide, 1994). Among key dimensions underlying TCA, they include uncertainty and asset specificity (Heide, 1994, Rindfleisch *et. al.*, 2010). The Theory provides a better platform on an appropriate form of governance to improve agriculture performance.

According to Rindfleisch and colleagues (2010), building blocks of TCA are opportunism and governance. In order to overcome opportunism, it is necessary to have sound monitoring mechanisms to avoid performance impairment of supply chain (Alchan and Demsetz, 1992). The two ghosts under TCA are opportunism and information asymmetry (uncertainty) such that once they are not managed appropriately they will enhance poor buyers and suppliers relationship thereby leading to poor agricultural performance.

Specific Investment is another key component of TCA and is grouped into two aspects: Supplier Specific Investment and Buyer Specific Investment where the former seeks to develop buyers and the latter seeks to develop suppliers. Physical resources and any other immaterial resources are referred to as asset specificity that can be designed to develop both supplier as well as buyer sides to improve performance (Heide and John, 1990).

Research Model and Hypothesis

Cotton Buyers' Specific Investment and Cotton Smallholder Farmers Performance: Specific Investment entails investments made by a buying firm in its suppliers (Wagner, 2006). Such supplier development efforts are intended to improve performance and the supply chain as a whole when used with other factors like effective communication, involvement of top management from the buyer's side and the buyer's long-term prospect (Handfield *et. al.*, 2000; Humphreys *et. al.*, 2004; Krause and Ellram, 1997). Some specific investment efforts are relationship specific in that the buying firm

commits time and resources towards supplier development through site visitations including offering technical assistance, training as well as education and so forth (Krause and Ellram, 1997; Wagner, 2006).

Buying firms invest in transaction-specific dedicated assets. The level of such transaction-specific investments by a buyer to a supplier is considered a sign of the buyer's commitment to that supplier. From the compliance perspective according to Joshi (1998), employment of specific assets by manufacturer(s) or buying firm implies a long-term profit or performance. Suppliers can also behave opportunistically after receiving such investments due to the fact that they know it is non-refundable on cancellation of the relationship. However, in the long run, they can miss future investment(s), depending on changes in environment thereby lead to poor performance. Buyers' specific investment in terms of provision of credit; training and education; equipment and tools; improved seedlings; and performance improvement initiatives are supposed to help growers to improve upon their performance as well as increase their outputs. Such investments by buyers in the growers' domain do not only help improve the suppliers' performance but also make the suppliers perceive buying firms as people who cared for them and wanted them to improve on their performance (Glavee-Geo and Buvik, 2012b). Suppliers who are recipient of such interventions see buyers as people who are less opportunistic. In due regard, a hypothesis was posited that, *H1: There is a positive association between Cotton Buyers' Specific Investment (SPECI) and Cotton Smallholder Farmers' Performance (PERF).*

Cotton Smallholder Farmers' Performance (PERF)

To measure cotton smallholder farmers' performance (PERF), the approach used in studies by Glavee-Geo (2013) was adapted. The construct consisted seven items positively worded and anchored from 1 strongly disagree to 7 strongly agree as follows:

PERF1: I usually deliver cotton to this buyer on time.

PERF2: This buyer is always satisfied with quality of cotton I offer.

PERF3: I frequently do not mix cotton plantations with other crops

on the same plot of land.

PERF4: This buyer is always satisfied with quantity of cotton I offer.

PERF5: I respond quickly to changes suggested to me by this buyer on cotton production.

PERF6: I respond quickly to changes suggested to me by this buyer on cotton harvesting.

PERF7: I always perform well on cotton storage.

Cotton Buyers' Specific Investment (SPECI)

To measure cotton buyers' specific investment (SPECI), the approach used in studies by Gundlach and colleagues (1995); Skarmeas and co-workers (2002); and Provan and Skinner (1989) was used as a guide. The construct consisted six items positively worded and anchored from 1 strongly disagree to 7 strongly agree as follows:

SPECI1: This buyer frequently provides training to me on cotton production.

SPECI2: This buyer regularly provides training to me on proper usage of pesticides and fertilizers.

SPECI3: This buyer always provides transportation facilities to me for timely delivery.

SPECI4: This buyer frequently provides storage facilities to me.

SPECI5: This buyer regularly provides credit to support me.

SPECI6: This buyer regularly offers assistance to me in searching for loans from financial institutions.

Control Variables

In addition to cotton smallholder farmers' performance (PERF) and cotton buyers' specific investment (SPECI), two control variables, namely, environmental uncertainty (ENVUNC) and farm size (FARMSIZE) were included in the model. Farm size (FARMSIZE) was measured in terms of number of hectares one farmer held, while four items of environmental uncertainty (ENVUNC) adapted from Glavee-Geo (2013) were used. The construct consisted four items

negatively worded and anchored from 1, strongly agree to 7 strongly disagree as follows:

ENVUNC1: The demand for cotton varies significantly over time.

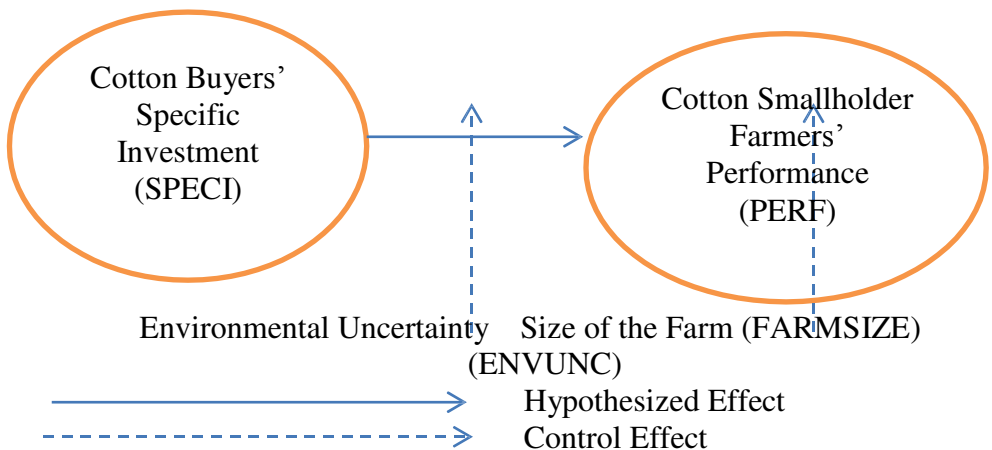
ENVUNC2: The market condition for the cotton is very unstable.

ENVUNC3: The cotton production mostly relies on rainfall.

ENVUNC4: Our most important competitors on cotton production are regularly moving on producing other products rather than cotton.

Figure 1.1 shows how cotton buyers' specific investment (SPECI) influences on cotton smallholder farmers' performance (PERF). Control variables in the model, farm size (FARMSIZE) and environmental uncertainty (ENVUNC), are also presented (Figure 1.1).

Figure 1.1: Research Model



Research Methodology

This study used cross-sectional survey and case study strategy whereby it was carried out at cotton growers in Simiyu region of Tanzania. Data were collected by administering questionnaire to cotton growers and ordinary least square method through Statistical Package for Social

Scientists (SPSS) applied to obtain statistical estimates for hypothesis test.

Primary data were collected through a self-administered questionnaire from one hundred thirty two (132) respondents mostly, smallholder farmers in midst of August, 2016. For this study, secondary data were sourced from the web pages of International Cotton Organization (ICO) and the Tanzania Cotton Board (TCB). Also additional data were accrued from books, journal articles, past theses from online sources that relate to cotton and transaction cost theory. A convenience sampling procedure was used to obtain respondents. It involved selection of respondent who happened to be around at the time the researcher were visiting provided that he/she has been cultivating cotton for more than three years.

Measurements Assessment and Data Validation

In this study, the data set was checked for errors such as outliers but that was found to be non-existent. Descriptive statistics were run for the variables. The items were checked for normality and they were found to be acceptable in meeting various assumptions of normality. This is important because when it is not normal, it will compromise results of correlation and factor analysis (Hair *et. al.*, 1998).

Scale Reliability: Scale reliability for each of the latent construct was assessed. That was done by first, undertaking an exploratory factor analysis (EFA). According to Pallant (2007 p. 179), factor analysis refers to data reduction technique whereby large data sets are taken and a way is found for reducing them into a smaller set of factors or components.

Three factors were identified, namely, factor1: cotton buyers' specific investment (SPECI), factor2: cotton smallholder farmers' performance (PERF) and factor 3: environmental uncertainties (ENVUNC). Items with factor loadings less than .40 (SPECI4, SPECI5, PERF1, PERF3, PERF5) were deleted and all cross-loading items were also deleted. Results showed that all factor loadings were between .822 and .980 as follows: SPECI1 (.910), SPECI2 (.957), SPECI3 (.916), SPECI6

(.938), PERF2 (.970), PERF4 (.912), PERF6 (.823), PERF7 (.970), ENVUNC1 (.979), ENVUNC1 (.977) ENVUNC1(.832) and ENVUNC1(.909). High factor loading was recognized to be a good indicator of high convergent validity (Hair *et. al.*, 1998). The Cronbach alpha of each factor was used in assessing internal consistency in this study. This is due to the fact that it is a very important indicator of reliability and without it, the other tests will have no meaning (Mentzer and Flint, 1997). The Cronbach alpha is used to compare how each of the questions in a questionnaire will correlate with the other questions measuring the construct. The coefficient of Cronbach’s alpha of the constructs is shown in Table 1.1 and it indicates that all measurement items forming a construct/factor have internal consistent reliability greater than .70 as recommended by Nunnally (1967).

Table 1.1: Reliability

Constructs	Items	Number of Items	Reliability Cronbach Alpha (α)
Performance	PERF 2, 4, 6, 7	4	.941
Specific Investment	SPECI 1, 2, 3, 6	4	.960
Environmental uncertainty	ENVUNC 1, 2, 3, 4	4	.941

Data Analysis and Empirical Findings

Regression Model: The regression model that was applied in this study used the Ordinary Least Square (OLS) estimation technique. All variables were included in the regression model. The model looks as follows:

$$PERF = b_0 + b_1 SPECI + b_2 ENVUNC + b_3 FARMSIZE + \hat{Y}$$

Correlation matrix: Correlation matrix presented in Table 1.2 shows results from the correlation analysis and the corresponding means as well as standard deviations. Results revealed that cotton buyers’ specific investment (SPECI) is significantly associated with smallholder farmers’ performance (PERF).

Table 1.2: Correlation Matrix

	PERF	SPECI	ENVUNC	Size of farm in hectares
PERF	1	.320**	-.008	-.115
SPECI		1	-.065	.042
ENVUNC			1	-.140
Size of farm in hectares				1
Mean	4.58	3.91	4.08	5.61
SD	1.13	1.49	1.39	1.54

** . Correlation is significant at the 0.01 level (2-tailed).

Regression analysis: Results from hierarchical multiple regression analysis technique are shown in Table 1.3. Results from the study indicated that there were no high inter-correlations between independent variables since all tolerance values were greater than .10. This indicates that there is no serious multicollinearity. A VIF value of 10 or above is an indicator of existence of multicollinearity (Pallant, 2007). The individual VIF also indicates that variables in this study are not highly correlated.

Table 1.3: Regression analysis: Dependent variable, Cotton Smallholder Farmers' Performance

Hierarchical Regression Model	Independent variables	Unstandardized coefficients	t-value	Tolerance (VIF)
R ² =.119	Constant b ₀	4.172	7.699	
	SPECI b ₁	.246	3.907***	.995 (1.005)
	ENVUNC b ₂	-.004	-.063	.977 (1.024)
	Size of farm in hectares b ₃	-.095	-1.544	.979 (1.021)

R² adj=.098 F (3, 128) = 5.760 p =.001

***p<.01 t-values greater than 2.33 are significant at 0.01 one-tail

An overall assessment of goodness of fit model showed model fit based on $F(3, 128) = 5.760$ at significance level of p equal to 0.01 and $R^2 = 0.119$, $R^2 \text{ adj} = 0.098$). An interpretation of the $R^2 \text{ adj} = 0.098$ means that 9.8 percent of variance in the cotton smallholder farmers' performance (PERF) construct is explained by the independent variables (Specific Investment-SPECI, Environmental Uncertainty-ENVUNC, Size of farm in hectares) in the model, whilst the remaining percent of the explanation is done by other non-included variables. The $R^2 = 0.119$ means 11.9 percent of variation in cotton smallholder farmers' performance (PERF) is explained by variation in cotton buyers' specific investment (SPECI). Thus, further research could look on other contributing factors that have been included in the model. This was reported by Newbold, Carlson, and Thorne (2010) who argued that R^2 for all models using information collected from an individual should be greater than or equal to 0.1. From the regression model (Table 1.3), estimates were extracted and inserted into equation to give: $\text{PERF} = 4.172 + 0.246\text{SPECI} - 0.004\text{ENVUNC} - 0.095\text{FARMSIZE}$.

The statistics from Table 1.3 show that cotton buyers' specific investment (SPECI) is positively associated with cotton buyers' specific investment (SPECI) at a significant level of probability less than .01, with $b_1 = -.246$ and $t = 3.907$. The estimation shows that the relationship is significant. Presented statistical results support the hypothesis H1: There is a positive association between Cotton Buyers' Specific Investment (SPECI) and Cotton Smallholder Farmers' Performance (PERF). A significant positive association is observed between Cotton Buyers' Specific Investment (SPECI) and Cotton Smallholder Farmers' Performance (PERF) as hypothesized. The estimate is summarized ($b_1 = -.246$, $t = 3.907$, $p < .01$).

Discussion and Implications of the Study

In Transaction Cost Analysis (TCA), it is argued that because buying firms invest in the suppliers, expectation of normative behavior by both partners in the relationships makes suppliers perceive buyers less opportunistic than expected and therefore, motivate him/her to perform well. Thus, cotton growers who are suppliers in such relational exchange perceive buying firms and their purchasing agents less opportunistic. In such a way, deployment of specific investment leads

to some normal development and friendships that can influence the way one partner performs to satisfy another as suggested by this study. Cotton growers who receive some specific investment from buyers tend to perform better than those who do not receive such investment. Availability of specific investment initiatives by buyers contribute to enhancing the buyer-seller relationship that improves performance. This factor contributes to enhancing economic as well as social aspects of the relationship through development of friendships after repeated exchanges. Satisfactory cotton buyers' specific investment to cotton smallholder farmers then translates into improved smallholder farmers' performance (Glavee-Geo and Buvik, 2012).

A managerial implication of this study is that managers of buying firms would have to increase specific investment to smallholder farmers such as frequent provision of training and education on cotton production together with proper use of pesticides as well as fertilizers. Also buying firms have to provide transportation facilities, storage facilities as well as credit to support smallholder farmers. The theoretical implication of this study to Transaction Cost Theory is that the study contributes to extant literature on how specific investment if applied well can improve smallholder farmers' performance. This is due to the fact that few studies have employed specific investment to link directly to smallholder farmers' performance.

References

- Alchan, A. A. and Demsetz, H. (1992) "Production, Information Costs, and Economic Organization". *The American Economic Review*, 62(5), p.777-795
- Baffes, John. 2002. "Tanzania's Cotton Sector: Constraints and Challenges in Global Environment" *Africa Region Working Paper Series No. 42*
- Delpeuch, C. and Vandeplass, A. 2011. "Revisiting the "cotton problem" A comparative analysis of cotton reforms in Sub-Saharan Africa"

- Gibbon, Peter. 1999. "Free Competition without Sustainable Development? Tanzanian Cotton Sector Liberalization, 1994/95 to 1997/98." *Journal of Development Studies* 36: 128-50.
- Glavee-Geo, R. and Buvik, A. (2012), Factors Influencing Supplier Performance and Satisfaction in Agro-commodity value chains, proceedings of the 21st International Purchasing and Supply Education and Research Association (IPSERA)
- Heide JB and John G. (1990). Alliances in industrial purchases: the determinants of joint action in buyer –seller relationships. *Journal of Marketing Research*, 27; 24-36.
- Heide, J. B (1994). Inter-Organizational Governance in Marketing Channels: Theoretical Perspectives on Forms and Antecedents, *Journal of Marketing*, 58
- International Assessment of Agricultural Knowledge, Science and Technology for Development. (2009). *Agriculture at a Crossroads*. Washington, D.C.: Island Press.
- Joachim N. (2015) Habari Leo News Paper <http://www.habarileo.co.tz/index.php/makala/811-naondoka-muinueni-mkulima-mdogo>
- Mbilinyi, M. (1988). Agribusiness and women peasants in Tanzania. *Development and Change*, 19(4), 549-583.
- Nunnally, P. (1967). *Psychometric Theory*, 2nd ed., New York Mc Graw- Hill.
- Pallant, J. (2007). *SPSS Survival Manual Third edition* Mc Graw Hill
- Pingali, P. (ed.) (2001). *CIMMYT 1999-2000 World Maize Facts and Trends. Meeting World Maize Needs: Technological Opportunities and Priorities for the Public Sector*. Mexico, D.F.: CIMMYT.

Poulton, Colin (2009) *The Cotton Sector of Tanzania*. Africa Region Working Paper Series No. 127. Washington, DC: World Bank.

Revisiting the “cotton problem” A comparative analysis of cotton reforms in Sub-Saharan Africa

Rindfleisch, A., Antia, K., Bercovitz, J., Brown, J.R., Cannon, J., Carson, S.J., Ghosh, M., Helper, S., Robertson, D.C., and Wathne K.H. (2010) “Transaction Cost Opportunism, and Governance: Contextual Considerations and Future Research Opportunities” *Market Lett* 21: p.211-222.

The World Bank (2012). Development Research Group Agriculture and Rural Development Team. <http://www.taccire.suanet.ac.tz/xmlui/bitstream/handle/123456789/187/agric%20and%20trade%20WB.pdf?sequence=1>

Tschirley, D. L., Poulton, C., Gergely, N., Labaste, P., Baffes, J., Boughton, D., & Estur, G. (2010). Institutional diversity and performance in African cotton sectors. *Development Policy Review*, 28(3), pp295-323

USDA (2011) *Production, Supply and Distribution Online*, United States Department of Agriculture, Washington DC. Available: <http://www.fas.usda.gov/psdonline/> (Accessed: August 30, 2011).

Wagner, S. M. (2006). “Supplier Development Practices: An Exploratory study.” *European Journal of Marketing* 40 (5/6), p.554-571.

World Bank. (2003). *Sustainable development in a dynamic world*. In: *World Development Report*. Washington, D.C.: World Bank.