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Muindi, Victor Nguma and James Maina Rugami,

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¹Muindi, Victor Nguma

Post Graduate Student, Kenyatta University

Corresponding Email: victornguma@yahoo.com

²James Maina Rugami,

Lecturer, Kenyatta University

ABSTRACT

Purpose: The general objective of the study was to establish the effect of the Agricultural Sector Development Strategy on agricultural productivity in Tana River County.

Methodology: This study employed descriptive survey design since it is an efficient method of collecting data as it involved studying large and small population. It targeted the sixty eight (68) technical staff members in the agriculture sector in Tana River County as its population. A census was used since the population was small. The study utilised questionnaires with both open and close ended questions for collection of data where the drop and pick method was used to administer the same.

Results: The study found that climate change response, agribusiness and market access, agricultural extension services and access to agricultural credit positively and significantly influences agricultural productivity.

Unique contribution to theory, practice and policy: The study recommended that Tana River County should implement agricultural extension services by ensuring there is enough staff in the county who are regularly capacity building so as to improve the agricultural productivity of the county.

Keywords: *Productivity, climate change, agricultural sector*

1.0 INTRODUCTION

1.1 Background of the Study

Wiley (2010) defines a strategy as the pattern of purposes, policies, programs, actions, decisions or resource allocations that define what an organization is, what it does and why it does it. Strategy is also a term that refers to a complex web of thoughts, ideas, insights, experiences, goals, expertise, memories, perceptions, and expectations that provides general guidance for specific actions in pursuit of particular ends. Strategy is at once the course we chart, the journey we imagine and, at the same time, it is the course we steer, the trip we actually make (Nicklos, 2016). Strategic planning on the other hand is to a business what a map is to a road rally driver. It is a tool that defines the routes that when taken will lead to the most likely probability of getting from where the business is to where the owners or stakeholders want it to go. And like a road rally, strategic plans meet detours and obstacles that call for adapting and adjusting as the plan is implemented. Strategic planning is a process that brings to life the mission and vision of the enterprise (Dix & Matthews, 2002).

Public sector organizations around the world face important questions about how to fulfil their core mission, respond to political and environmental changes, and deliver services to citizens despite reduced budgets. To answer these questions, organizations must undertake rigorous strategic planning - a process that can be difficult, especially in the context of a diverse stakeholder environment with numerous and often divergent interests and priorities. Strategic planning approaches developed in the private sector can help public sector organizations deal with the recent dramatic changes in their environments. For example, "strategic planning is a disciplined effort to produce fundamental decisions shaping the nature and direction of governmental activities within constitutional bounds" It can help governments become more effective (Hughes, 2012).

Policy makers and development practitioners who are responsible for developing investment strategies to promote economic growth find many challenges in the changing face of agriculture in the twenty-first century. In addition to its productive role of providing food, clothing, fuel, and housing for a growing world population, agriculture assumes other roles, the importance of which has more recently been recognized. In addition to its essential role in food security, agricultural development is now seen as a vital and high-impact source of poverty reduction. It is also seen as a source of environmental problems and a contributor to global warming, water scarcity and pollution, and land degradation. At the same time its potential as a source of environmental services needs to be defined, monitored, and evaluated. Many of the issues facing the sector transcend national boundaries but there is a lack of direction regarding agricultural data requirements posed by the Millennium Development Goals (MDG) and other emerging issues such as the use of food for biofuels, and the environment and food security; there is also a general decline in the overall quality and availability of agricultural statistics which led to the development of the global strategy to improve agricultural and rural statistics (World Bank, FAO & UN, 2010).

Agricultural development is one of the most powerful tools to end extreme poverty, boost shared prosperity and feed 9 billion people by 2050. Growth in the agriculture sector is about two to four times more effective in raising incomes among the poorest compared to other sectors. This

is important for 78% percent of the world's poor who live in rural areas and depend largely on farming to make a living. Agriculture is also crucial to economic growth: it accounts for one-third of gross-domestic product (GDP) and three-quarters of employment in Sub-Saharan Africa. But agriculture-driven growth and poverty reduction, as well as global food security are at risk: Agriculture is more vulnerable to climate change than any other sector. A warming climate could cut crop yields by more than 25%. Agriculture and land use change are also responsible for between 19–29% of global greenhouse gas emissions (World Bank, 2015).

Agriculture can be a source of growth for the national economy, a provider of investment opportunities for the private sector, and a prime driver of agriculture-related industries and the rural nonfarm economy. Two thirds of the world's agricultural value added is created in developing countries. In agriculture-based countries, it generates on average 29 percent of the gross domestic product (GDP) and employs 65 percent of the labour force. The industries and services linked to agriculture in value chains often account for more than 30 percent of GDP in transforming and urbanized countries. Agricultural production is important for food security because it is a source of income for the majority of the rural poor. It is particularly critical in a dozen countries of Sub-Saharan Africa, with a combined population of about 200 million and with highly variable domestic production, limited tradability of food staples, and foreign exchange constraints in meeting their food needs through imports. These countries are exposed to recurrent food emergencies and the uncertainties of food aid, and for them, increasing and stabilizing domestic production is essential for food security (World Bank, 2008).

Given the importance of food security in East Africa, especially in the light of climate change, the third meeting, third session of the Second East African Legislative Assembly (EALA) sitting at the Chambers of the Parliament of Uganda in Kampala 17th February, 2010 adopted a common strategy for food security in the region. It noted that the region as a whole had substantial unutilized potential for agriculture and that even the resources that are put into use are underutilised because of low productivity of labour, land and water (EALA, 2010).

1.2 Statement of the Problem

Developing strategies is really a way to focus your efforts and figure out how you're going to get things done. By doing so, you can take advantage of resources and emerging opportunities, respond effectively to resistance and barriers and ensure a more efficient use of time, energy, and resources (Nagy & Fawcett, 2014). The ASDS vision is a food-secure and prosperous nation whereas its mission is innovative, commercially oriented and modern agriculture. The overall development and growth of the sector is anchored in two strategic thrusts: increasing productivity, commercialization and competitiveness of agricultural commodities and enterprises; and developing and managing the key factors of production. These thrusts will require critical inputs and support from enabling sectors and factors such as a conducive macro-economic environment, security, infrastructure, education and social development. To deliver the vision of the agricultural sector, institutional reforms and better coordination will be critical (GoK, 2010).

Agriculture plays a major role in Tana River County as it contributes to the livelihood of the communities through agro- pastoralism. Food security in the county is enhanced through agriculture by preferred foodstuff being available in the county and also by enhancing access as a

result of income earned through employment as alternative source of livelihood hence increasing the nutritional status of the population in the county. The main problem facing the agricultural sector in Tana river include; Low agricultural production leading to food shortage, crops destruction by wildlife, livestock attacks by wild animals and encroachment of forests by human beings leading to environmental destruction (ASDSP, 2014).

Child fund International (2015) reports that farmers in Kenya are still facing many challenges; from difficult environmental conditions to administrative land ownership hurdles, subsistence farming in Kenya can be hard for families living in poverty. Some farmers have turned to an agricultural initiative known as the One Acre Fund to overcome these challenges, but the project has had mixed results. One of the greatest obstacles facing Kenyan farmers is not planting and harvesting crops, but supply chain management. Although some farmers have grown impressive yields in recent years, it is not always easy for them to get their produce to market or work with regional food suppliers to ensure a steady source of income.

1.3 Objectives of the Study

The general objective of the study was to establish the effect of the Agricultural Sector Development Strategy on agricultural productivity in Tana River County.

1.3.1 Specific Objectives

The study specifically achieved the following objectives;

- i. To evaluate the extent to which climatic change response has affected agricultural productivity in Tana River County;
- ii. To examine the effect of agribusiness and market access to agricultural productivity in Tana River County;
- iii. To evaluate the extent to which agricultural extension services have affected agricultural productivity in Tana River County; and
- iv. To examine the effect of access to agricultural credit on agricultural productivity in Tana River County.

2.0 LITERATURE REVIEW

2.1 Theoretical Review

2.1.1 Resource Based View Theory

The resource based view theory was developed in 1984 by Birger Wernerfelt. In theory and practice of strategic management a number of different concepts of corporate competitiveness have been formulated. In the 1980's strategic research generated a new approach explaining economic results of businesses operating in a competitive environment through the resources owned by them. In western literature this approach is referred to as the Resource-Based View of the Firm (RBV), whereas in Polish literature as a resource approach or strategy. RBV is based on the assumption that in business the key success factor is the access to strategic resources and skills and their effective use. An enterprise owning the resources relevant to its economic activity and adopted strategy has more chance to succeed than an enterprise whose resources are not compatible with its activity (Wronka & Maćkowska, 2011).

Public organizations working as open systems operate in conjunction with the environment. Interaction between the organization and its environment occurs while it is assumed that the impact of the environment on organizations is much greater than vice versa. The theory and practice of management clearly indicate the need for a proper diagnosis of the environment as an essential element of building an organization's strategy, although the very concept of the environment and its components can be handled differently. Diagnosing the environment is a prerequisite for the successful building of the organizational strategy. The environment of public organizations tends to be turbulent, which results in their politicization and consequent inability to predict upcoming changes on one hand, and – on the other hand - their complexity stemming from the existence of a large number of stakeholders within public organizations, whose expectations they are forced to fulfil, and which often are mutually exclusive. Literature in the field of management as one of the possible prescriptions for increasing environmental turbulence indicates the resource approach – Resource Based View - which assumes that the success of the organization lies within the organization itself, or to be exact – in its valuable, intangible and not perfectly imitable resources (VRIO condition) allowing it to achieve a sustainable competitive advantage Barney and Clark, (cited in Szymaniec-Mlicka, 2014).

The growing importance of the public sector for socio-economic development of a country is reflected in the greater interest of researchers seeking answers about effective methods and tools for the management of public sector organizations. One of the important directions of research are issues of strategic management of the public organizations and searching for solutions improving their efficiency in that area, especially in an increasingly dynamic environment. One of the proposed solutions is to use the resource-based view (RBV) which focuses on the interior structure of the organization, as well as its resources and capabilities that will better meet the emerging challenges (Szymaniec-Mlicka, 2014).

2.1.2 Systems Theory

The system theory was developed by biologist Ludwig Von Bertalanffy in 1936. Hayajneh (2007) defines a system as a collection of independent but interrelated elements or components organized in a meaningful way to accomplish an overall goal. The function of any system is to convert or process materials, energy, and/or information (inputs) into a product or outcome for use within the system, or outside of the system (the environment) or both. This theory is based on the view that managers should focus on the role played by each part of an organization; rather than dealing separately with the parts (Hannagan, 2002). The systems theory maintains that an organization does not exist in a vacuum. It does not only depend on its environment but it is also part of a larger system such as the society or the economic system to which it belongs. The systems approach is concerned with both interpersonal and group behavioural aspects leading to a system of cooperation (Koontz, 2001).

The agriculture sector is a complex system consisting of the staff, various departments and numerous stakeholders. It is also a sub-system of a larger system called the government. The system theory emphasizes unity and integrity of the organization and focuses on the interaction between its component parts and the interactions with the environment. It suggests that organizations must be studied as a whole taking into consideration the interrelationships among its parts and its relationship with the external environment. As an open system, the agriculture sector responds to the external influences as it attempts to achieve its strategic objectives and this

study seeks to measure the interaction between the sector and its environment in the implementation of the ASDS and how agricultural productivity has been affected.

2.2 Empirical Review

Nelson, et al (2009) reported that climate-change adaptation is increasingly on the agenda of researchers, policymakers, and program developers who are aware that climate change is real and threatens to undermine social and ecological sustainability. In agriculture, adaptation efforts focus on implementing measures that help build rural livelihoods that are more resilient to climate variability and disaster and an assessment of the costs of productivity-enhancing investments in agricultural research, rural roads, and irrigation infrastructure and efficiency that can help farmers adapt to climate change. In their report titled *Climate change, Impact on Agriculture and Costs of Adaptation* they assessed the costs of adaptation identify agricultural productivity investments that reduce child malnutrition with climate change to no-climate-change levels, holding all other macro changes constant, such as income and population growth. They concluded that agriculture and human well-being will be negatively affected by climate change. Crop yields will decline, production will be affected, crop and meat prices will increase, and consumption of cereals will fall, leading to reduced calorie intake and increased child malnutrition.

In their study “Necessary and Sufficient Conditions for Agribusiness Success of Small-scale Farming Systems in Northern Vietnam”, Ha, Bosch, and Nguyen (2015), they conducted their in Haiphong (Vietnam) during 2013-2014 to analyse the requirements for the success of small-scale agribusinesses. Following two baseline studies on the current state of the local farming systems and market situations, various stakeholders were engaged in a number of workshops with support of a causal loop diagram (CLD) modelling tool to redefine the pre-requisites for agribusiness success and their interplays. As a result, multi-stakeholder collaboration and government support via its policies and development programs were identified as the necessary conditions for success. They also observed that majority of the world’s poor is smallholder farmers who are reliant on agricultural production. Securing market access for agricultural produce has been identified as one of the most important strategies towards rural development and poverty alleviation (Fischer & Qaim, 2012). They concluded that a multi-actor partnerships and government support through policies and development programs are highly necessary. However, it cannot guarantee the success of small-scale agribusinesses unless the sufficient conditions are met. That is, strengthening the capacity of local producer groups and investing in human and social capitals are required to address context-specific needs, and to facilitate collective actions and ownership of their livelihood development strategies towards a sustainable future.

In their study “Agricultural Extension in Kenya: Practice And Policy Lessons” Muyanga and Jayne (2006) assed the quality of extension service provision for food crops and livestock in Kenya, with a broad aim of understanding what exists, what works, and why. The study employed both qualitative and quantitative methods and used primary and secondary data gathered from government published Economic Surveys, statistical abstracts and public expenditure review reports. They noted that Kenya’s small farmers have traditionally benefited from two major types of extension systems, that is the government extension system and the commodity-based systems run by government parastatals, out grower companies and cooperatives. As a result of ineptness in the public extension system, a third type of extension

service -- private agricultural extension system has emerged. They concluded that private extension provision is generally skewed towards high potential regions and high value crops. Remote areas and poor producers, especially those growing low-value crops with little marketable surplus, are poorly served. Non-commercial providers are targeting them but their scope is limited since public resources for extension are very constrained.

Anderson and Feder (2004) studied a framework outlining farmers' demand for information, the public goods character of extension services, and the organizational and political attributes affecting the performance of extension systems. In their study "Agricultural Extension: Good Intentions and Hard Realities" this conceptual framework was used to analyse several extension modalities and their likely and actual effectiveness. They argued that investments in extension services have the potential to improve agricultural productivity and increase farmers' incomes, especially in developing economies, where more than 90 percent of the world's nearly 1 million extension personnel are located. They also noted that over the past four decades, extension operations have been one of the largest institutional development efforts the world has ever known. Hundreds of thousands of technicians have been trained, and hundreds of millions of farmers have had contact with extension services. As countries struggle with declining public budgets, a key question must wonder how effective these extension investments have been.

Yehuala also found out that farmers acknowledged group lending that solves the problem of collateral requirement by lending institutions, controls misuse of borrowed funds and minimizes the risk of default and they also recognized the provision of saving services by Micro Finance Institution (MFI), while strongly criticizing the isolation of very poor farmers from the group formation. Moreover, the smaller loan size, earlier saving requirement which was not convenient to the farmers, and repayment period by the MFI were among the critical problems. Participation in extension package programs, Experience in credit use from the formal sources, total cultivated land size, number of livestock in tropical livestock unit, collateral or group formation and membership of Farmers Multi-Purpose Service Cooperatives (FMSC) were highly important in influencing access to formal credit use as evidenced by the model output.

3.0 METHODOLOGY

This study employed descriptive survey design since it is an efficient method of collecting data as it involved studying large and small population. It targeted the sixty eight (68) technical staff members in the agriculture sector in Tana River County as its population. A census was used since the population was small. The study utilised questionnaires with both open and close ended questions for collection of data where the drop and pick method was used to administer the same. This study tested reliability of the instruments using Cronbach's alpha where a value 0.7 and above was considered acceptable. To enhance validity, a pilot study was done through administering questionnaires randomly to seven (7) selected respondents in Tana River sub-county which is 10% of the total respondents. It was further enhanced by making necessary adjustments to the questionnaire based on the pilot study results. Quantitative data was analysed by descriptive statistics, and presented through tables and charts. Qualitative data was coded into different words, concepts, themes, phrases and characters and analysed through Content Analysis. A simple regression model utilising the ordinary least squares regression analysis was used to determine the influence that the independent variables have on the dependent variable

4.0 ANALYSIS, RESULTS AND DISCUSSIONS

4.1 Demographic Characteristics

The respondents were asked to indicate their gender. Majority of the respondents were male who represented 96% of the sample while only 4% were female. This implies that the majority of the staffs in the agriculture sector in Tana River County were male. The respondents were also asked to indicate their level of education. Majority of the respondents who were 48.5% indicated that their highest level of education to be diploma, 20.6% of the respondents indicated that their highest level of education is undergraduate, 19.1% of the respondents indicated that their highest level of education is certificate while only 11.8% of the respondents indicated that their highest level of education is postgraduate. This implies that the majority of the staffs in the agriculture sector in Tana River County were had their highest level of education as diploma level and thus had the relevant skills for the job. In addition the respondents were asked to indicate the number of years they have been in public service. Majority of the respondents who were 66.2% indicated that they have been in public service for above 15 years, 13.2% indicated that they have been in public service for 1–5 years, 13.2% indicated that they have been in public service for 6–10 years while only 7.4% indicated that they have been in public service for 11– 15 years. This implies that majority of the staff in the agriculture sector in Tana River County had worked for many years and therefore had good knowledge about the agriculture sector. The respondents were also asked to indicate the department that they belong. Majority of the respondents who were 64.7% of the respondents indicated that they belonged to agriculture department, 22.1% of the respondents indicated that they belonged to livestock production, 8.8% of the respondents indicated that they belonged to fisheries department. This implies that majority of the staff in the agriculture sector in Tana River County belonged to agriculture department.

4.2 Descriptive Statistics

4.2.1 Climate Change Response

The first objective of the study was to evaluate the extent to which climatic change response has affected agricultural productivity in Tana River County. The respondents were asked to respond to statements on climate change response. The responses were rated on a five likert scale as presented in Table 4.1. Majority of the respondents who were 44.1% (27.9%+16.2%) agreed with the statement that the government had increased greatly both National Expanded and Smallholder irrigation programs in the county and this has greatly increased agricultural productivity. The results also showed that majority of the respondents who were 54.4% also agreed with the statement that drought tolerant crops and animal breeds have been introduced in the county and has boosted productivity. In addition majority of the respondents who were 47% also agreed with the statement that there is timely provision of climate related information and farmers are advised on time and productivity has increased due to this. Lastly majority of the respondents who were 44.1% also agreed with the statement that animal and crop pests and diseases are controlled in time using environment friendly pesticides. Agricultural productivity has been greatly enhanced by this measure.

On a five point scale, the average mean of the responses was 3.11 which mean that majority of the respondents were agreeing with most of the statements; however the answers were varied as shown by a standard deviation of 1.21.

Table 4.1: Climate Change Response

Statement	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Std. Dev
The government has increased greatly both National Expanded and Smallholder irrigation programs in the county and this has greatly increased agricultural productivity.	10.30%	32.40%	13.20%	27.90%	16.20%	3.07	1.29
Drought tolerant crops and animal breeds have been introduced in the county and has boosted productivity	8.80%	20.60%	16.20%	42.60%	11.80%	3.28	1.18
There is timely provision of climate related information and farmers are advised on time and productivity has increased due to this.	13.20%	17.60%	22.10%	38.20%	8.80%	3.12	1.20
Animal and crop pests and diseases are controlled in time using environment friendly pesticides. Agricultural productivity has been greatly enhanced by this measure	7.40%	30.90%	17.60%	33.80%	10.30%	2.97	1.17
Total						3.11	1.21

4.2.2 Agribusiness and Market Access

The second objective of the study was to examine the effect of agribusiness and market access to agricultural productivity in Tana River County. The respondents were asked to respond to the statements on climate change response. Results in table 4.2 revealed that majority of the respondents who were 51.4% (38.2%+13.2%) agreed with the statement that micro processing plants have been introduced in the county to value add animal and crop products. This has

encouraged productivity and increased farmers' incomes. The results also revealed that majority of the respondents who were 54.4% agreed with the statement that roads and other market related infrastructure have been improved thus enhancing market access. This has reduced post-harvest losses, increased incomes thus encouraging farmers to produce more. The results also revealed that majority of the respondents who were 75% agreed with the statement that information on modern methods of farming is readily available and farmers use such information to improve productivity. The results also showed that majority of the respondents who were 63.2% agreed with the statement that the government has partnered with many stakeholders including the private sector to enhance agribusiness and market access.

On a five point scale, the average mean of the responses was 3.5 which mean that majority of the respondents were agreeing with most of the statements; however the answers were varied as shown by a standard deviation of 1.2.

Table 4.2: Agribusiness and Market Access

Statement	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	St d. Dev
Micro processing plants have been introduced in the county to value add animal and crop products. This has encouraged productivity and increased farmers' incomes	10.30%	29.40%	8.80%	38.20%	13.20%	3.2	1.3
Roads and other market related infrastructure have been improved thus enhancing market access. This has reduced post-harvest losses, increased incomes thus encouraging farmers to produce more.	8.80%	22.10%	14.70%	38.20%	16.20%	3.3	1.2
Information on modern methods of farming is readily available and farmers use such	5.90%	7.40%	11.80%	48.50%	26.50%	3.8	1.1

information to improve productivity							
The government has partnered with many stakeholders including the private sector to enhance agribusiness and market access which has also translated to high productivity	4.40%	25.00%	7.40%	45.60%	17.60%	3.5	1.2
Total						3.5	1.2

4.2.3 Agricultural Extension Services

The third objective was to evaluate the extent to which agricultural extension services have affected agricultural productivity in Tana River County. The results from table 4.3 revealed that majority of the respondents who were 60.4% (39.50% + 20.90%) agreed with the statement that the government sets enough budgets for extension services and trainings which in turn has enhanced agricultural productivity in. The results also showed that majority of the respondents who were 66.3% agreed with the statement that there is enough extension staff in the county who is regularly capacity built and well facilitated for their work. This has improved productivity in the county. The results also revealed that majority of the respondents who were 67.5% agreed with the statement that the government has embraced e-extension and provided the necessary equipment which has improved service delivery to farmers and in turn productivity has been enhanced.

On a five point scale, the average mean of the responses was 3.71 which implies that majority of the respondents were agreeing with most of the statements; however the answers were varied as shown by a standard deviation of 1.2.

Table 4.3: Agricultural Extension Services

Statement	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Std.Dev
The government sets enough budget for extension services and trainings which in turn has enhanced agricultural productivity in the county.	10.50%	19.80%	9.30%	39.50%	20.90%	3.41	1.31
There is enough extension staff in the county who are regularly capacity built and well facilitated for their work. This has improved productivity in the county	4.70%	25.60%	3.50%	32.60%	33.70%	3.65	1.31
The government has embraced e-extension and provided the necessary equipment which has improved service delivery to farmers and in turn productivity has been enhanced.	5.80%	14.00%	12.80%	38.40%	29.10%	3.71	1.20
Total						3.59	1.27

4.2.4 Access to Agricultural Credit

The fourth objective of the study was to examine the effect of access to agricultural credit on agricultural productivity in Tana River County. The results revealed that majority of the respondents who were 53.5% (38.4% + 15.10%) agreed with the statement that farmers have access to low cost credit to do capital investments in irrigation, value addition and other developments and this has greatly improved yields. The results also revealed that majority of the respondents who were 67.5% agreed with the statement that key farm inputs are easily available at low cost or subsidized prices and this has enabled farmers to increase productivity. The results also revealed that majority of the respondents who were 61.3% agreed with the statement that there are enough credit institutions in the county and farmers have a wide range of choice to access agricultural credit.

On a five point scale, the average mean of the responses was 3.48 which mean that majority of the respondents were agreeing with most of the statements; however the answers were varied as shown by a standard deviation of 1.2.

Table 4.4: Access to Agricultural Credit

Statement	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Std. Dev
Farmers have access to low cost credit to do capital investments in irrigation, value addition and other developments and this has greatly improved yields	8.10%	23.30%	15.10%	38.40%	15.10%	3.29	1.21
Key farm inputs are easily available at low cost or subsidized prices and this has enabled farmers to increase productivity	3.50%	22.10%	7.00%	44.20%	23.30%	3.62	1.17
There are enough credit institutions in the county and farmers have a wide range of choice to access agricultural credit	5.80%	19.80%	12.80%	40.40%	20.90%	3.52	1.21
Total						3.48	1.20

4.3 Inferential Statistics

4.3.1 Correlation Analysis

Table 4.5 below presents the results of the correlation analysis. The results revealed that climate change response and agricultural productivity are positively and significant related ($r=0.585$, $p=0.000$). The table further indicated that agribusiness and market access and agricultural productivity are positively and significantly related ($r=0.591$, $p=0.000$). It was further established that agricultural extension services and agricultural productivity were positively and significantly related ($r=0.583$, $p=0.000$). Similarly, results showed that access to agricultural credit and agricultural productivity were positively and significantly related ($r=0.623$, $p=0.000$). This implies that an increase in any unit of the variables leads to an increase in agricultural productivity.

Table 4.5: Correlation Matrix

		Agricultural Productivity	Climate change Response	Agribusiness	Agricultural Extension Services	Access to Agricultural Credit
Agricultural Productivity	Pearson Correlation	1.000				
	Sig. (2-tailed)					
Climate change Response	Pearson Correlation	.585**	1.000			
	Sig. (2-tailed)	0.000				
Agribusiness	Pearson Correlation	.591**	.502**	1.000		
	Sig. (2-tailed)	0.000	0			
Agricultural Extension Services	Pearson Correlation	.583**	.425**	.328*	1.000	
	Sig. (2-tailed)	0.000	0	0.006		
Access to Agricultural Credit	Pearson Correlation	.623**	.457**	.563*	.403**	1.000
	Sig. (2-tailed)	0.000	0	0	0.001	

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

4.3.2 Regression Analysis

The results presented in table 4.6 present the fitness of model used of the regression model in explaining the study phenomena. Climate change response, agribusiness and market access, agricultural extension services and access to agricultural credit were found to be satisfactory variables in agricultural productivity. This is supported by coefficient of determination also known as the R square of 60.9%. This means that climate change response, agribusiness and market access, agricultural extension services and access to agricultural credit explain 60.9% of the variations in the dependent variable which is agricultural productivity. This results further means that the model applied to link the relationship of the variables was satisfactory.

Table 4.6: Model Fitness

Indicator	Coefficient
R	0.781
R Square	0.609
Adjusted R Square	0.584
Std. Error of the Estimate	0.41012

In statistics significance testing the p-value indicates the level of relation of the independent variable to the dependent variable. If the significance number found is less than the critical value also known as the probability value (p) which is statistically set at 0.05, then the conclusion would be that the model is significant in explaining the relationship; else the model would be regarded as non-significant.

Table 4.7 provides the results on the analysis of the variance (ANOVA). The results indicate that the overall model was statistically significant. Further, the results imply that the independent variables are good predictors of agricultural productivity. This was supported by an F statistic of 24.556 and the reported p value (0.000) which was less than the conventional probability of 0.05 significance level.

Table 4.7: Analysis of Variance

	Sum of Squares	df	Mean Square	F	Sig.
Regression	16.521	4	4.13	24.556	0.000
Residual	10.596	63	0.168		
Total	27.118	67			

Regression of coefficients results in table 4.8 shows that climate change response and agricultural productivity are positively and significant related ($r=0.164$, $p=0.031$). The table further indicates that agribusiness and market access and agricultural productivity were positively and significant related ($r=0.157$, $p=0.026$). It was further established that agricultural extension services and agricultural productivity were positively and significantly related ($r=0.285$, $p=0.001$) while access to agricultural credit and agricultural productivity were also positively and significantly related ($r=0.233$, $p=0.009$)

Table 4.8: Regression of Coefficients

	B	Std. Error	t	Sig.
(Constant)	-0.063	0.203	-0.31	0.758
Climate change Response	0.164	0.075	2.204	0.031
Agribusiness and Market Access	0.157	0.069	2.281	0.026
Agricultural Extension Services	0.285	0.084	3.395	0.001
Access to Agricultural Credit	0.233	0.087	2.692	0.009

Thus, the optimal model for the study is;

Agricultural productivity = -0.063 + 0.164 climate change response + 0.157 Agribusiness and Market Access + 0.285 Agricultural Extension Services + 0.233 Access to Agricultural Credit

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Based on the study findings the study concluded that climate change response has a positive and significant influence on agricultural productivity.

Based on the study findings the study concluded that agribusiness and market access has a positive and significant influence on agricultural productivity.

In addition the study concluded that market access for local food products are mainly based on existing relationships and linkages between the supply chain actors and the local food producers.

The study also concluded that multi-actor partnerships and government support through policies and development programs are highly necessary. However, it cannot guarantee the success of small scale agribusinesses unless the sufficient conditions are met.

The study also concluded that private extension provision is generally skewed towards high potential regions and high value crops. Remote areas and poor producers, especially those growing low-value crops with little marketable surplus, are poorly served. Non-commercial providers are targeting them but their scope is limited since public resources for extension are very constrained.

The study also concluded that agricultural productivity gains from agricultural extension are highest at the top end of the distribution of yield residuals, suggesting that agricultural extension may be enhancing unobserved productive attributes of farmers such as managerial abilities.

Based on the study findings the study concluded that access to agricultural credit have a positive and significant influence on agricultural productivity.

5.2 Recommendations

Based on the research findings the study recommended that urgent measures be undertaken to mitigate the impact of climate change on agricultural production. These measures include: research and development of agricultural technologies, investment in irrigation infrastructure and dissemination of information to farmers on climate change and possible impacts.

The study also recommended that the government should increase greatly both national expanded and small irrigation programs in Tana River County so as to boost the agricultural productivity of the county.

The study also recommended that micro processing plants should be introduced in Tana River County to value add animal and crop products. This will help to increase agricultural productivity in the county.

In addition the study also recommended that the Tana River County government should partner with many stakeholders including the private sector to enhance agribusiness and market access which will translate to high productivity.

Based on the research findings the study recommended that Tana River County should implement agricultural extension services by ensuring there is enough staff in the county who are regularly capacity building so as to improve the agricultural productivity of the county.

In addition Tana River County government should embrace agricultural extension services and provide necessary equipment which will help to increase the agricultural productivity of the county.

The study also recommended that Tana River County government should ensure farmers have access to low cost credit so as to do capital investment in irrigation, value addition and other development which will help to increase the agricultural productivity in the county.

REFERENCES

- Anderson, J. R., & Feder, G. (2004). Agricultural Extension: Good Intentions and Hard Realities. *The World Bank Research Observer*, vol. 19, no. 1, 41- 57
- Dix, J., F., & Matthews, H., L., (2002). *The Process of Strategic Planning*. Article #1 of 10. Retrieved from http://fisher.osu.edu/supplements/10/1470/All_Articles.pdf
- Hughes, O. E. (2012). *Public Management and Administration*
- Kibet, C. (2011). *Major Challenges facing Kenyan Agricultural sector. Extension Services*. Retrieved from <http://extensionconference2011.cta.int/node/111>
- Muyanga, M., & Jayne, T. S. (2006). *Agricultural Extension in Kenya: Practice And Policy Lessons*. Tegemeo Institute of Agricultural Policy and Development: Egerton University, Working Paper 26 (2006)
- Nagy, J., & Fawcett, S. B. (2014). *Why Develop Strategies?* Retrieved from, <http://ctb.ku.edu/en/table-of-contents/structure/strategic-planning/develop-strategies/main>
- Nelson, G. C. Rosegrant, M. W. Koo, K. Robertson, R. Sulser, T. Zhu, T. Ringler, C. Msangi, S. Palazzo, A. Batka, M. Magalhaes, M. Valmonte-Santos, R. Ewing, M. & Lee I. L. (2009). Climate Change. Impacts on Agriculture and Costs of Adaptation. *IFPRI Food Policy Report# 0-89629-535-4*, 13-17
- Wiley, J. (2010). *The Jossey-Bass handbook of Non-profit Leadership* (3rd Ed), 186
- Wronka, A. F., & Maćkowska, R. (2011). *The Resource-Based View in the Management of a Public Organization – A Stakeholder Perspective*, 93