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Case Study

# Analyzing the Nexus Between Economic Policies, Extension Strategies, and Sustainable Agricultural Development in Somalia

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# ABSTRACT

Agriculture is a cornerstone of Somalia's economy, playing a pivotal role in employment, production, market stability, financial resilience, and foreign exchange. This study examines the interplay between economic policies, extension strategies, and sustainable agricultural development in Somalia. Using a descriptive research design, data were collected from 165 participants across four regions, including Mogadishu, to evaluate demographic and educational factors, as well as the impact of economic policies and extension services on sustainable agricultural practices. The findings indicate that while government economic policies are generally viewed positively, limited access to credit and financial services remains a major challenge. The variability in support from extension services highlights the urgent need for targeted improvements to bolster sustainable agriculture and food security. These results emphasize the critical importance of policy reforms and enhanced service delivery in advancing agricultural sustainability in Somalia.

Keywords: Sustainable agricultural development; Agricultural practices; Policy impact assessment; Rural development strategies

# Introduction

Agriculture constitutes the bedrock of Somalia's economic development, serving as a critical sector that contributes to labor supply, production outputs, market stability, financial resources, foreign exchange earnings, and national budgetary balance<sup>1</sup>. The Somali economy is predominantly reliant on agriculture, reflecting a broader global trend where agricultural productivity plays a fundamental role in driving economic growth, ensuring sustainable development, and enhancing food security in both developed and developing nations<sup>2</sup>. Within the context of

globalized economies, agriculture is instrumental in fostering economic development, alleviating poverty, and supporting societal progress, functioning as both a driver and a remedy for economic prosperity<sup>3</sup>.

Agricultural policies encompass a wide array of government decisions that directly influence the pricing stability of inputs and outputs, public investments in agricultural production, resource allocation, and the overall economic sustainability of the sector<sup>4</sup>. In the East African region, for instance, agriculture contributes approximately 33% to Kenya's GDP and generates

at least 40% of employment, despite recent stagnation within the sector<sup>5</sup>. Agricultural policy, as an evolving framework, governs the intricate relationships between agriculture, the environment, and society, and remains central to advancing agricultural economic growth<sup>6</sup>. However, the efficacy of these policies often depends on governmental commitment and farmer participation and is impeded by various challenges, including technical, social, political, and economic constraints<sup>7</sup>.

Extension education, a key component of agricultural development, functions as an informal educational process designed to support rural communities. However, data and information on agricultural extension services remain sparse, both at the local level in Somalia and within international organizations<sup>8</sup>. The Somali Ministry of Agriculture is currently constrained by significant political, social, and economic challenges, with the collapse of national institutions during periods of conflict further undermining the sector's capacity and performance<sup>9</sup>.

Farmers in Somalia face persistent challenges, including limited access to quality seeds, fertilizers, and agricultural machinery. Additionally, the absence of effective government extension services and veterinary support restricts their ability to adopt advanced agricultural practices and adequately address livestock health issues<sup>10</sup>. Addressing these constraints requires fostering robust linkages between extension services, agricultural colleges, universities, and training institutions to ensure that agricultural and extension education aligns with the evolving needs of the agricultural sector<sup>11</sup>.

Economic growth remains a critical priority for Somalia, particularly in the context of poverty alleviation. The Federal Government of Somalia must formulate comprehensive strategies to promote agricultural development (Figure 1), including the provision of agricultural input subsidies to incentivize broader participation in the sector<sup>12</sup>. Extension services should be strategically oriented towards enhancing the technical knowledge, social skills, and sustainable practices of rural populations, thereby fostering resilience and ensuring long-term sustainability within the agricultural value chain<sup>13</sup>.





Somali farmers continue their traditional practices as they cannot find adequate technical and support services from the government and other institutions. For this reason, agricultural production is low and Somali local farmers don't have enough agricultural extension and education<sup>14</sup>. Much remained unknown on the assessed role of agricultural extension services contributing to the socio-economic development of small and medium farmers in East Africa, especially in Somalia<sup>15</sup>.

Thus, the aim of this study is to evaluate the impact of Soma-

li government economic policies on sustainable agricultural practices, examining their efficacy and areas for improvement **(Table 1)**. It also analyzes the role of agricultural extension services in fostering agronomic sustainability and food security, highlighting disparities and potential enhancements.

Table 1: Economic Indicators in Somalia

2020	Somalia
GDP	\$10.4billion
Real GDP Growth	2.4%
GDP Per Capita	592.1 dollars
Inflation rate	6.7%

In many developing countries, governance has been identified as one of the critical weaknesses of public agricultural extension and education systems. Agricultural policy and extension enhances farmers' skills, addresses challenges, and promotes economic well-being, fostering sustainable development. Agricultural extension programs are vital for farmers, offering essential knowledge and modern technology to boost productivity and crop quality. Farmers strongly endorse agricultural extension programs to enhance productivity, adopt technology, and adapt to environmental challenges<sup>16</sup>.

Normally such learning is facilitated through both informal and formal institutions. In many countries, extension services represent one such example of a formal institution that is critical in supporting small-scale agriculture and achieving national and household food security<sup>17</sup>.

The 20th century has witnessed substantial increases in the intensity of agricultural land management, much of which has been driven by policies to enhance food security and production. Each year farms are required to provide details of their agricultural activity, which are aggregated and made available at the level of local government administrative regions<sup>18</sup>. One of the central elements of the development of each country's economy is efficient and modern agriculture. The transition to a higher level of economic growth is accompanied by the reduction of differences between the share of agriculture in the creation of GDP and employment<sup>19</sup>.

# Methodology

## **Research design**

The study employed a descriptive research design, which is ideal for examining a specific phenomenon at a given point in time. Descriptive research is often used to assess the characteristics of a population, identify patterns, and understand relationships between variables. In this study, both qualitative and quantitative approaches were integrated to ensure comprehensive data collection. The qualitative aspect allowed for in-depth understanding of participants' perspectives on the role of government policies and extension services in promoting sustainable agriculture. The quantitative approach facilitated the measurement of trends, patterns, and the extent of the impact of agricultural policies on different sectors involved in agriculture. A cross-sectional survey methodology was used, which enables data collection from a large group of participants at one point in time. This design is particularly practical in research with time constraints, as it allows for the simultaneous collection of data from different individuals, offering a snapshot of the phenomenon under study. Given the dynamic and evolving nature of agricultural practices and policies in Somalia, this methodology provided a practical approach for gathering relevant data within a limited timeframe.

#### Study area

The research was conducted in four diverse regions of Somalia: Mogadishu (the capital city), Afgooye, Beledweyne, Jowhar, and Kismayo. These regions were selected to capture a broad spectrum of agricultural and socio-economic contexts. Mogadishu represents the urban setting and central government institutions, while Afgooye, Beledweyne, Jowhar, and Kismayo reflect rural and semi-urban areas that are directly involved in agricultural production. These regions also vary in terms of exposure to natural disasters such as floods, making them particularly relevant for understanding the impact of environmental factors on agriculture.

The study areas were further characterized by varying levels of access to agricultural resources, including extension services, credit facilities, and government support. The diversity of these regions ensured that the findings would be more representative of the national context and allowed for a deeper understanding of how agricultural policies and practices play out in different settings.

#### Sampling strategy

The study population consisted of 280 participants from the selected areas, including farmers, business owners, government officials, and researchers. The participants were selected using a purposive sampling technique, ensuring that key stakeholders involved in agriculture and rural development were represented. This method allowed for the selection of participants based on specific characteristics relevant to the study, such as their role in agricultural production, involvement in government policies, and experience with agricultural extension services.

Due to resource constraints, a sample size of 165 participants was selected, which is a manageable number for detailed analysis within the given time and budgetary limits. The sample size determination was based on Sloven's formula, resulting in 165 participants selected from the target population of 280.

$$n = \frac{N}{1 + N(e)2} = \frac{280}{1 + 280(0.0025)} = 165$$

Where;

n = Size of the sample N = size of the population e = significance level, estimated at 0.05

Data analysis was performed using percentages, with the SPSS software employed for quantitative analysis.

#### **Results and Discussions**

The research findings indicate that the statistical analysis conducted on a sample of 165 individuals involved in the agriculture sector yielded significant insights into their demographic and educational characteristics. The mean values, representing the average age, educational background, and level of involvement in agriculture, were calculated to be approximately 1.97 years, 2.24, and 2.44, respectively. These figures were derived from a dataset meticulously examined to discern patterns and trends within the population under study. Moreover, measures such as standard deviation and variance were employed to gauge

the extent of dispersion in the data, shedding light on the variability across different variables. Notably, the research underscores the need for contextual understanding, as the interpretation of these statistical parameters is contingent upon the specific coding system utilized. Despite these nuances, the findings contribute to a deeper comprehension of the characteristics of individuals engaged in agriculture, laying the groundwork for further inquiry into the factors influencing their participation in the sector. The research underscores the value of employing descriptive and inferential statistics to derive meaningful insights and inform evidence-based decision-making within the agricultural domain (**Tables 2 and 3**).

Table 2:	Statistical	Analysis
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		What is your sex?	What is your age? (In years)	What is your educational ba- ckground?	What is your involvement in the agricul- ture sector?
N	Valid	165	165	165	165
1	Missing	0	0	0	0
Mean		1.2788	1.9697	2.2364	2.4424
Std. Error	of Mean	.03501	.06571	.08462	.08262
Std. Devia	tion	.44977	.84409	1.08701	1.06124
Variance		.202	.712	1.182	1.126
Range		1.00	3.00	3.00	3.00
Sum		211.00	325.00	369.00	403.00

Table 3:	Demographic	Information.
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What is your sex?	Frequency	Percent
Male	119	72.1
Female	46	27.9
Total	165	100.0
What is your age?		
Less than 29	51	30.9
30-40	78	47.3
41-50	26	15.8
Greater than 50	10	6.1
Total	165	100.0
What is your education level?		
High school	66	40.0
Some college courses	10	6.1
Bachelor	73	44.2
Postgraduate	16	9.7
Total	165	100.0
What is your involvement in th	e agriculture	sector?
Business owner	47	28.5
Government official	23	13.9
Agricultural researcher/student	70	42.4
Farmer	25	15.2
Total	165	100.0

The demographic analysis of the study participants provides a comprehensive understanding of the sample composition. The gender distribution shows a significant male majority, with 72.1% (119 respondents) being male and 27.9% (46 respondents) female, indicating a gender disparity within the sample. Age-wise, many respondents fall within the 30-40 age group (47.3%), followed by those under 29 years (30.9%), while smaller proportions are aged 41-50 (15.8%) and over 50 (6.1%). This age distribution suggests that the respondents are predominantly middle-aged, which may influence their perspectives and experiences in agriculture. Regarding education, a notable 44.2% of respondents hold a bachelor's degree, and 40% have completed high school, reflecting a relatively high educational attainment within the sample. Only a small fraction has pursued postgraduate studies (9.7%) or some college courses (6.1%). In terms of involvement in the agriculture sector, the largest group comprises agricultural researchers or students (42.4%), followed by business owners (28.5%), farmers (15.2%), and government officials (13.9%). This diverse representation across different roles in agriculture provides a broad perspective on the factors influencing sustainable practices and food security in Somalia **(Table 4)**.

Table 4: Statistical analysis of the Extension and econom	nic.
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		Government Economic Poli- cies in Somalia	Access to credit and financial services	Infrastructure development (e.g., roads, irrigation)	Agri- cultural extension services	Farmer's participation in extension services	The capacity and resources of extension service	Farmer's adoption of sustainable practices	Sustainable agri- culture contribu- tes to increased food security
Ν	Valid	165	165	165	165	165	165	165	165
	Missing	0	0	0	0	0	0	0	0
Mean		3.7939	2.3939	3.4303	3.0424	3.0970	2.8364	3.2788	3.1576
Std. Error of M	ean	.08178	.09791	.09773	.09031	.10107	.12760	.09596	.09571
Std. Deviation		1.05053	1.25764	1.25535	1.16006	1.29833	1.63905	1.23262	1.22947
Variance		1.104	1.582	1.576	1.346	1.686	2.686	1.519	1.512
Range		4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Sum		626.00	395.00	566.00	502.00	511.00	468.00	541.00	521.00

In (table 3), the statistical analysis of various factors influencing sustainable agriculture in Somalia reveals significant insights. Government economic policies received the highest mean score (3.7939), indicating that respondents perceive these policies positively in promoting sustainable agricultural practices. Conversely, access to credit and financial services had the lowest mean score (2.3939), highlighting a critical area needing improvement. The standard deviations and variances suggest varying degrees of consensus among respondents, with the capacity and resources of extension services showing the highest variability (standard deviation of 1.63905 and variance of 2.686). This variability implies that experiences and opinions differ widely regarding the support provided by extension services.

Overall, the data underscores the need for targeted interventions in financial access and extension service capacity to enhance the adoption of sustainable practices. While government policies are favorably viewed, significant gaps in financial services and extension support could hinder progress toward sustainable agriculture and improved food security. Strengthening these areas through policy enhancements (**Table 5**), infrastructure investments, and resource allocation for extension services could facilitate better outcomes in sustainable agricultural practices and food security in Somalia. Similar results were reported by the study<sup>20</sup>.

Table 4 provides a detailed analysis of the perceptions regarding economic policies and infrastructure development for sustainable agriculture in Somalia. A significant majority of respondents, 66.7%, agree or strongly agree that government economic policies effectively incentivize sustainable agricultural practices, reflecting a generally positive perception. This research is welcomed<sup>21</sup>. Who also reported highly significant differences in government economic policies in Somalia effectively incentivize sustainable agricultural practices<sup>22</sup>. However, a notable 11.5% disagree or strongly disagree, indicating that some feel these policies are not effective, while 21.8% remain neutral, suggesting a diversity of opinions on this issue. In stark contrast, access to credit and financial services for Somali farmers is viewed negatively by a substantial portion of the respondents. Specifically, 67.9% either disagree or strongly disagree that these services are readily available, underscoring a critical barrier to investing in sustainable agricultural practices.

Table 5: Data on Economic Policies

Economic Policies	Response	Frequency	Percent
	Strongly disagree	6	3.60%
	Disagree	13	7.90%
policies in Somalia	Neutral	36	21.80%
effectively incentivize	Agree	64	38.80%
practices	Strongly agree	46	27.90%
	Total	165	100.00%
	Strongly disagree	42	25.50%
	Disagree	70	42.40%
Access to credit and fi- nancial services is readily	Neutral	13	7.90%
available for Somali far-	Agree	26	15.80%
nable agriculture.	Strongly agree	14	8.50%
	Total	165	100.00%
	Strongly disagree	14	8.50%
Infrastructure develop-	Disagree	33	20.00%
tion) adequately supports	Neutral	20	12.10%
the transportation and	Agree	64	38.80%
ly produced agricultural products.	Strongly agree	34	20.60%
	Total	165	100.00%

These results support the findings of the following study by<sup>23</sup>. Only 24.3% believe that access to financial services is adequate, with a small percentage of 7.9% remaining neutral. This indicates that financial constraints are a significant hurdle for farmers aiming to adopt sustainable practices. Agricultural economic constraints showed a high difference, supported by<sup>24</sup>. Regarding infrastructure development, such as roads and irrigation systems, 59.4% of respondents agree or strongly agree that it adequately supports the transportation and marketing of sustainably produced agricultural products. This result is further supported by<sup>25</sup>. However, 28.5% of respondents disagree or strongly disagree, pointing out that there is still considerable room for improvement. A smaller segment, 12.1%, is neutral on this issue, reflecting mixed experiences and perceptions

among the respondents. Overall, while government policies and infrastructure development are generally perceived positively, the overwhelming concern about the lack of accessible financial services highlights a critical area that needs urgent attention to promote sustainable agricultural practices in Somalia. Addressing this financial barrier could significantly enhance the effectiveness of existing policies and infrastructure in supporting sustainable agriculture and improving food security (**Table 6**).

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Extension Strategies	Response	Frequency	Percent
	Strongly di- sagree	22	13.30%
	Disagree	26	15.80%
Agricultural extension services in Somalia effectively dissemi-	Neutral	55	33.30%
nate knowledge and best practi-	Agree	47	28.50%
ces for sustainable agriculture.	Strongly agree	15	9.10%
	Total	165	100.00%
	Strongly di- sagree	31	18.80%
	Disagree	21	12.70%
Farmers actively participate in	Neutral	31	18.80%
and engage with extension ser-	Agree	65	39.40%
	Strongly agree	17	10.30%
	Total	165	100.00%
	Strongly di- sagree	68	41.20%
The capacity and resources of	Neutral	20	12.10%
extension service providers are sufficient to meet the needs of	Agree	45	27.30%
Somali farmers.	Strongly agree	32	19.40%
	Total	165	100.00%

Table 6.	Data	on	Extension	Strategies
Table o:	Data	on	Extension	Strategies

Table 5 provides a detailed examination of extension strategies in Somalia, highlighting the effectiveness of agricultural extension services, farmer participation, and the sufficiency of resources for service providers. The data illustrates a diverse range of perceptions among respondents. Regarding the effectiveness of agricultural extension services, 28.5% agree and 9.1% strongly agree that these services effectively disseminate knowledge and best practices for sustainable agriculture. These results are supported by Our results are also in line with those who obtained effectively disseminated knowledge and best practices for sustainable agriculture<sup>26,27</sup>. However, a substantial 15.8% disagree and 13.3% strongly disagree with this statement, while 33.3% remain neutral. The observation is like the study done<sup>28</sup>. This indicates a significant level of uncertainty or skepticism about the impact of extension services. When considering farmer participation, 39.4% agree and 10.3% strongly agree that farmers actively engage with extension services. Conversely, 18.8% disagree and 12.7% strongly disagree with this notion, suggesting that there are challenges in effectively involving farmers in extension activities. This research is strengthened For farmers to actively participate in and engage with extension services<sup>29</sup>. Regarding the sufficiency of resources for extension service providers, opinions are divided, with 27.3% agreeing and 19.4% strongly agreeing that resources are adequate. A similar result was obtained<sup>30</sup>. However, a substantial 41.2% strongly disagree with this statement, indicating a widespread perception of inadequacy in resources. There was a high variation among our studies<sup>31</sup>. Additionally, 12.1% remain neutral on this issue, reflecting uncertainty or variability in perceptions of the complexities and challenges associated with extension strategies as well as supported<sup>32</sup>. These findings underscore the complexities and challenges associated with extension strategies in Somalia. While some respondents perceive positive impacts and active engagement, a significant portion expresses skepticism and dissatisfaction, particularly concerning the adequacy of resources (**Table 7**).

Sustainable Agricultural Development	Response	Frequency	Percent
	Strongly di- sagree	21	12.70%
	Disagree	21	12.70%
The adoption of sustainable	Neutral	38	23.00%
Somali farmers.	Agree	61	37.00%
	Strongly agree	24	14.50%
	Total	165	100.00%
	Strongly disagree	25	15.20%
	Disagree	22	13.30%
Sustainable agriculture is contri- buting to increased food security	Neutral	36	21.80%
and livelihoods for the commu-	Agree	66	40.00%
nities.	Strongly agree	16	9.70%
	Total	165	100.00%

Table 7: Sustainable Agricultural Development.

The table presents data on the adoption of sustainable practices among Somali farmers and the perceived contribution of sustainable agriculture to food security and livelihoods in communities. Analysis of the responses reveals diverse perspectives among respondents. Concerning the adoption of sustainable practices, a significant proportion, comprising 51.5% (agree and strongly agree combined) of respondents, acknowledges an increasing trend. This result is further supported<sup>33</sup>, who reported The adoption of sustainable practices is increasing among Somali farmers. This finding agrees with this research<sup>34</sup>. However, 25.4% disagree or strongly disagree with this notion, indicating skepticism or challenges in adopting sustainable practices. Similarly, regarding the contribution of sustainable agriculture to food security and livelihoods, a majority, 49.7% (agree and strongly agree combined), recognize its positive impact. This contribution of increased food security and livelihoods for the communities was close to those obtained previously<sup>35</sup>. Comparable results were reported by this research<sup>36</sup>. Another study advocated our research<sup>37</sup>. These results are further supported<sup>38</sup>. Nevertheless, a notable 28.5% disagree or strongly disagree with this statement, suggesting varying perceptions regarding the efficacy of sustainable agriculture in addressing food security and livelihood challenges in Somali communities. These findings underscore the importance of further research and targeted interventions to enhance the adoption of sustainable practices and maximize the potential of sustainable agriculture in contributing to food security and livelihood improvement in Somalia. This result is in line with that of<sup>39</sup>.

## Conclusions

The study concludes that while government economic policies in Somalia are generally perceived positively for promoting sustainable agricultural practices, critical gaps remain in access to credit and financial services. The demographic analysis highlights a male-dominated sector with a significant proportion of participants holding at least a high school education. The variability in the support provided by extension services indicates inconsistent experiences among farmers, which affects the adoption of sustainable practices. Enhancing the capacity and resources of extension services is crucial for fostering sustainable agricultural development and improving food security in Somalia. The study recommending:

- Enhancing sustainable agricultural development in Somalia by improving farmers' access to financial services through specialized agricultural banks or microfinance institutions.
- Strengthening the capacity and resources of agricultural extension services, coupled with better infrastructure, will facilitate more effective support and knowledge dissemination.
- Establishing closer linkages between educational institutions and extension services can ensure practical and relevant training.
- Lastly, promoting sustainable practices through awareness campaigns and incentives will further boost agricultural productivity and food security.

#### Author statement

Multiple authors example: The authors confirm contribution to the paper as follows: study conception and design, data collection, analysis, and interpretation of results: Mohamed Said, draft manuscript preparation, Literature discussion: Omar Mohamed Mumin and Mohamed Mursal Ibrahim. All authors reviewed the results and approved the final version of the manuscript.

# **Conflict of Interest**

The authors declare no conflict of interest.

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