Since 2001 ajfand AFRICAN JOURNAL OF FOOD, AGRICULTURE, NUTRITION AND DEVELOPMENT
SCHOLARLY, PEER REVIEWED
Volume 26 No. 9
October 2026
PUBLISHED BY AFRICAN SCHOLARLY SCIENCE COMMUNICATIONS TRUST
ISSN 1684 5374

Afr. J. Food Agric. Nutr. Dev. 2026; 26(9): 31148-31166 https://doi.org/10.18697/ajfand.156.26615

Date	Submitted	Accepted	Published
	24th November 2025	11th September 2026	19th November 2026

YOUTH ENGAGEMENT IN CLIMATE-RESILIENT AGRICULTURAL EXTENSION PROGRAMMES IN SIAYA COUNTY, KENYA

Dossi M[1]*, Andika DO[1] and R Mbinya[2]



Mary Dossi

*Corresponding author email: marydossii@gmail.com
ORCiD: https://orcid.org/0009-0004-9248-7545

[1]School of Agriculture and Food Science, Department of Plant, Animal and Food Sciences, Jaramogi Oginga Odinga University of Science and Technology, P.O. Box 210, 40601, Bondo, Kenya

[2]School of Agriculture and Food Science, Department of Agricultural Economics and Agribusiness Management, Jaramogi Oginga Odinga University of Science and Technology, P.O. Box 210, 40601, Bondo, Kenya

CC BY NC ND

Since 2001 ajfand AFRICAN JOURNAL OF FOOD, AGRICULTURE, NUTRITION AND DEVELOPMENT
SCHOLARLY, PEER REVIEWED
Volume 26 No. 9
October 2026
PUBLISHED BY AFRICAN SCHOLARLY SCIENCE COMMUNICATIONS TRUST
ISSN 1684 5374

ABSTRACT

Youth constitute a significant proportion of Kenya's population and have considerable potential to contribute to climate-resilient agricultural development. Engaging youth in climate-resilient agricultural extension programmes is very critical for enhancing productivity, food security, and sustainable livelihoods. However, socio-economic and institutional barriers constrain their participation in climate-resilient agricultural extension programmes, including limited access to land, financial resources, and agricultural training, as well as a lack of youth–friendly agricultural extension programmes. This study assessed youth participation and their capacity to engage in climate-resilient agricultural extension programmes in Siaya County, Kenya. A cross-sectional study design was employed using a structured questionnaire administered to 302 youths aged 18–35 years selected from six sub-counties of Siaya through simple random sampling. Data were analysed using descriptive statistics, Chi-square tests, and binary logistic regression in R Statistical Software version 4.2.1 (R Core Team). The findings from this study revealed that education level (P = 0.022), access to land (P = 0.030), monthly income (P = 0.013), and sub-county of residence significantly influenced participation in climate-resilient agricultural extension programmes. Youths with primary education, those without access to land, and those earning less than KES 10,000 per month were significantly less likely to participate than their counterparts. Before participation in climate–resilient agricultural extension programmes, the respondents generally reported low to moderate knowledge of climate- resilient agricultural practices, particularly regarding renewable energy, water management, agroforestry, pest and disease management, use of climate–resilient crop varieties, crop diversification, and soil conservation. The study concludes that strengthening youth participation requires targeted capacity-building initiatives, improved access to productive resources such as land, youth-responsive extension approaches, and location-specific interventions that address contextual differences across sub-counties. The findings provide evidence to inform county governments, extension agencies, and development partners in designing policies and programmes that enhance youth engagement in climate-resilient agriculture and sustainable rural livelihoods.

Key words: Youth Engagement, climate–resilient agriculture, Rural Youth, Agricultural Extension

Citation: Dossi M, Andika DO and R Mbinya Youth Engagement in Climate-resilient Agricultural Extension Programmes in Siaya County, Kenya. *Afr. J. Food Agric. Nutr. Dev.* 2026; **26(9):** 31148-31166. https://doi.org/10.18697/ajfand.156.26615

CC BY NC ND

Since 2001 ajfand AFRICAN JOURNAL OF FOOD, AGRICULTURE, NUTRITION AND DEVELOPMENT
SCHOLARLY, PEER REVIEWED
Volume 26 No. 9
October 2026
PUBLISHED BY AFRICAN SCHOLARLY SCIENCE COMMUNICATIONS TRUST
ISSN 1684 5374

INTRODUCTION

Agriculture remains the backbone of Kenya's economy, contributing approximately 33 % of GDP and employing over 40 % of the national workforce, with more than 75 % of rural livelihoods dependent on the sector [1]. Climate change, through erratic rainfall, prolonged droughts, and severe storms increasingly threatens this productivity, driving the promotion of climate-resilient practices such as agroforestry, soil conservation, and drought-resistant crop varieties [2]. Agricultural extension services are the primary channel through which such practices reach farming communities, linking research institutions to producers [3].

Similar findings have been reported in Kakamega County, where adoption of climate-smart agricultural practices among smallholder farmers was influenced by access to land, training, and agricultural extension services, factors that are also relevant to understanding youth participation in Siaya County [4]. Kakamega farmers benefit from a World Bank-funded Kenya Climate-Smart Agriculture Project (KCSAP) with dedicated county-level rollout, while Siaya's climate-resilient extension effort is comparatively recent a dedicated county-level rollout, while Siaya's climate-resilient extension effort is comparatively recent, anchored mainly in the County's 2023–2028 Climate Change Action Plan. This suggests that programme development and institutional investment, not just farmer characteristics, help explain variation in participation outcomes across Kenyan counties.

In Zambia's Mpulungu District, beneficiaries of a government agricultural input programme achieved significantly higher levels of land cultivation and maize productivity than non-beneficiaries, although uptake was constrained by barriers related to access to land, information, and financial resources [5].In north-western Benin, youth farm-business creation was influenced by access to land, market dependence, and labour availability, demonstrating the importance of productive resources and economic conditions in shaping youth engagement in agriculture [6]. In Cross River State, Nigeria, the effectiveness of agricultural extension models was found to depend on their alignment with farmers' socioeconomic circumstances, highlighting the importance of context-specific approaches in the delivery of agricultural extension services [7].

In Mzimba North, Malawi, youth participation in household farm decision-making was lower than that of women and men, highlighting the continued challenges associated with meaningful youth involvement in agricultural decision-making processes [8]. At the continental level, Africa's growing youth population represents an under-tapped resource for inclusive agricultural transformation, partly because investment in the skills, opportunities, and institutional structures required to engage youth in agriculture has not been in line with demographic growth [9]. Collectively, these studies identify three recurring constraints to youth engagement in agriculture:

CC BY NC ND

Since 2001 ajfand AFRICAN JOURNAL OF FOOD, AGRICULTURE, NUTRITION AND DEVELOPMENT
SCHOLARLY, PEER REVIEWED
Volume 26 No. 9
October 2026
PUBLISHED BY AFRICAN SCHOLARLY SCIENCE COMMUNICATIONS TRUST
ISSN 1684 5374

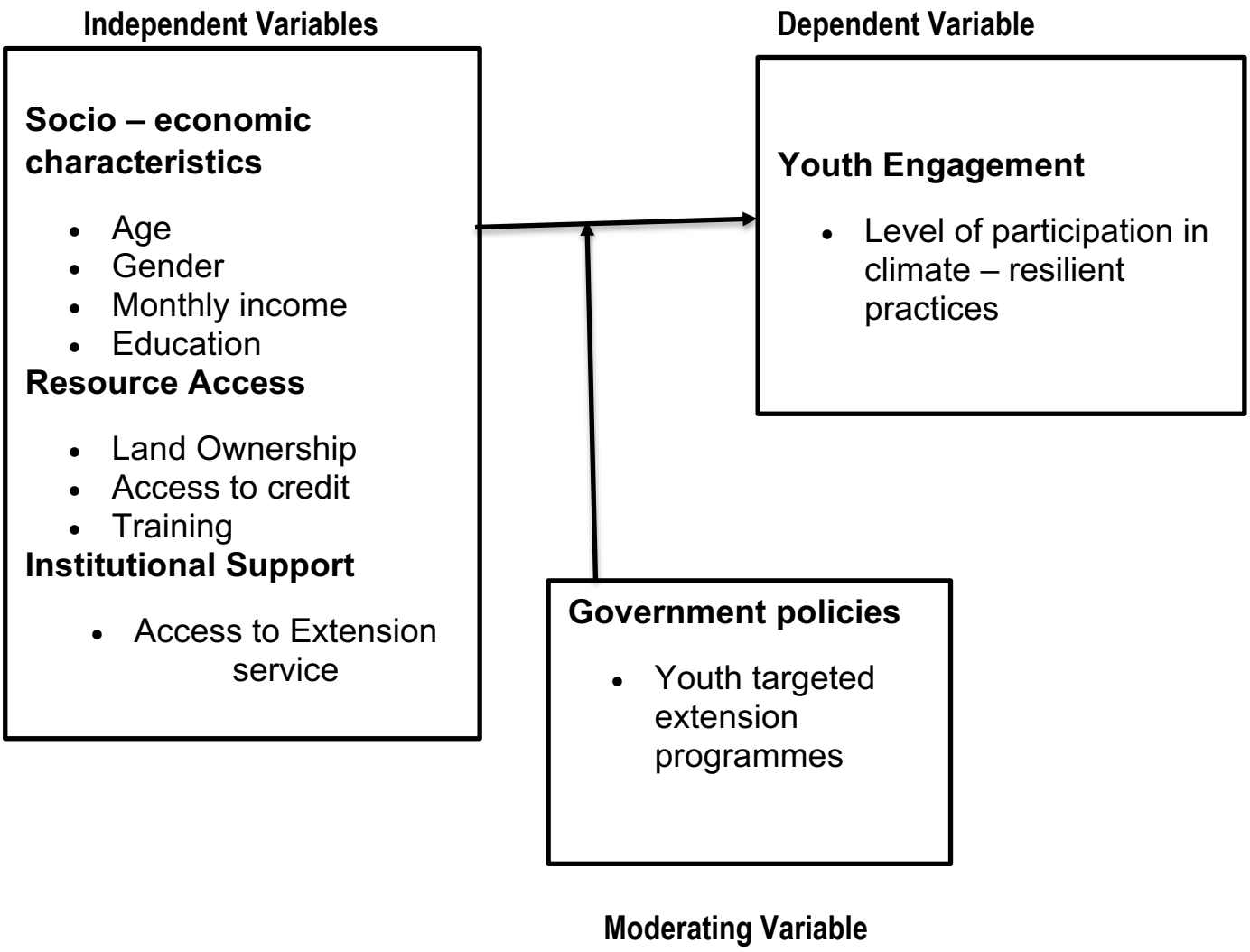
access to land, financial capacity, and the availability of locally appropriate agricultural support services. The evidence also suggests that institutional investment and programme maturity can influence participation outcomes, even where underlying socioeconomic characteristics are similar. However, Siaya County has not been adequately examined from this perspective. Existing county-level assessments describe climatic stress and policy intentions, including the Climate Change Action Plan and the Youth Agribusiness Strategy, but there is limited empirical evidence on youth participation, capacity, and constraints within climate-resilient agricultural extension programmes.

The originality of this research lies in providing the first empirical, county-level assessment of youth engagement in climate-resilient agricultural extension programmes in Siaya County, using primary survey data (n=302) rather than policy-document review, and in explicitly testing the demographic and socioeconomic predictors of participation through binary logistic regression, an analytical step largely absent from the comparative studies cited above. The objectives of this research are: (i) to assess the level of participation of youth in climate-resilient agricultural extension programmes in Siaya County and (ii) to assess the capacity of youth participating in these programmes.

CC BY NC ND

ajfand Since 2001
AFRICAN JOURNAL OF FOOD, AGRICULTURE, NUTRITION AND DEVELOPMENT
SCHOLARLY, PEER REVIEWED
Volume 26 No. 9
October 2026
PUBLISHED BY AFRICAN SCHOLARLY SCIENCE COMMUNICATIONS TRUST
ISSN 1684 5374

Conceptual Framework



The conceptual framework for this study portrays how numerous socioeconomic and institutional factors influence youth participation and adoption of climate-resilient farming practices. The independent variables include socioeconomic characteristics (age, gender, monthly income, and education), access to resources (land ownership, credit, and training), and institutional factors. These characteristics are predicted to have an impact on the dependent variable, which is youth engagement. The paradigm is based on the view that increased socioeconomic capacity, improved access to resources, and supportive institutional environments foster greater youth engagement and adoption of sustainable, climate-resilient agricultural technologies.

Study area

The study was conducted in Siaya County in the sub-counties of Alego Usonga, Gem, Ugenya, Ugunja, Rarieda, and Bondo. Siaya County is situated in the Nyanza region and covers a land area of 2,530 km² and a water area of 1,005 km² [10]. Smallholder mixed farming systems dominate agriculture in this county, which is the

CC BY NC ND

ajfand Since 2001
AFRICAN JOURNAL OF FOOD, AGRICULTURE, NUTRITION AND DEVELOPMENT
SCHOLARLY, PEER REVIEWED
Volume 26 No. 9
October 2026
PUBLISHED BY AFRICAN SCHOLARLY SCIENCE COMMUNICATIONS TRUST
ISSN 1684 5374

primary source of income [11]. The county frequently experiences climate-related hazards, including prolonged droughts, erratic rainfall, and periodic flooding, which significantly affect agricultural production and household food security.

Siaya County was specifically chosen for four reasons. Firstly, more than 75% of the county's rural population relies on rain-fed agriculture, making agricultural livelihoods particularly vulnerable to climate variability and increasing the relevance of climate-resilient agricultural practices and support services [12]. Secondly, the county's diverse agroecology, with high-rainfall zones across the six sub-counties suited to livestock and mixed farming, enables the study to capture variation in youth participation across meaningfully different farming contexts within the same county. Thirdly, unlike Kakamega County, where the Kenya Climate-Smart Agriculture Project (KCSAP) has operated with sustained donor and county government funding since 2017, Siaya County's climate-resilient agricultural extension efforts are relatively recent and have not been examined extensively in previous empirical studies [13]. Lastly, Siaya County was purposefully chosen because it has a sizable youth population, estimated at 327,658 people aged 18 to 35 years, according to the 2019 Kenya Population and Housing Census. The county has also benefited from government and development-partner initiatives aimed at promoting youth participation in agriculture, providing an appropriate context for examining youth participation and capacity in climate-resilient agricultural programmes [14].

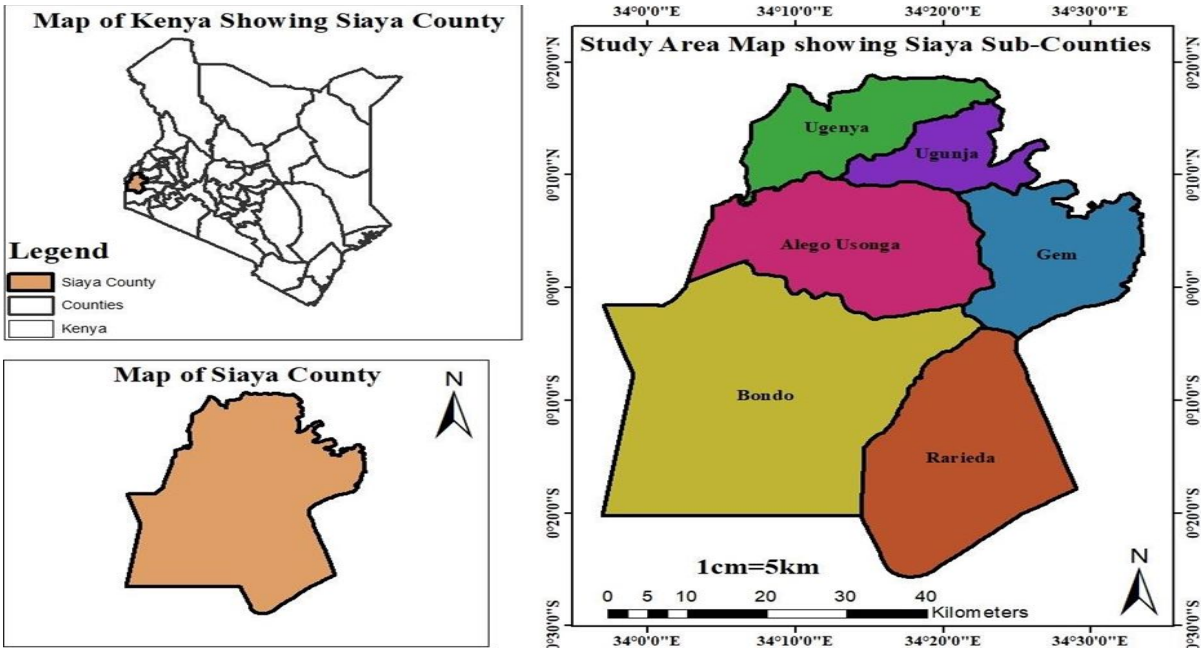


Figure 1: Map showing the six sub-counties of Siaya County
Source: Author's design using QGIS

CC BY NC ND

Since 2001 ajfand AFRICAN JOURNAL OF FOOD, AGRICULTURE, NUTRITION AND DEVELOPMENT
SCHOLARLY, PEER REVIEWED
Volume 26 No. 9
October 2026
PUBLISHED BY AFRICAN SCHOLARLY SCIENCE COMMUNICATIONS TRUST
ISSN 1684 5374

Target Population and Sample Size

The target population comprised youths aged 18–35 years who were engaged in agriculture within the six sub-counties of Siaya County**.** The sample size was calculated using Cochran's formula for infinite populations, whereby: n = Z^2 P (1- P) /e^2. The proportion size (P), anticipated sample size (n), Critical Value for the selected confidence level (Z) and margin of error (e).

Cochran's formula was used because the population of youths practising agriculture in the county is not known. A simple random method was used to select participants for the study. This ensured that every participant was treated fairly and had an equal opportunity to participate in the study. The study sampled 302 youths practising agriculture across the six sub–counties.

$$n = \frac{z^2\, p(1-p)}{e^2}$$

$$n = \frac{1.96^2 \times 0.5 \times 0.5}{0.0563^2}$$

n = 302

Data Collection

This study collected primary data through a survey using a structured questionnaire, developed from an extensive literature search. Enumerators fluent in local languages (Kiswahili and Luo) were carefully chosen and trained to effectively administer the survey, focusing on data collection methods, questionnaire comprehension and ethics. The questionnaire consisted of four sections: demographics and socio–economic characteristics (Section A), level of Participation of youths (Section B), Capacity of youths (Section C), and challenges to participation (Section D). The questionnaire was then digitized using the Kobo Collect software. This ensured automatic data storage and sped up data processing.

Data Analysis

Data analysis was conducted using R Statistical Software version 4.2.1. (R Core Team, 2022). After cleaning and categorizing the data, descriptive statistics, chi–square test and binary logistic regression were applied to achieve the study's objectives. Analysis of Objective 1 (level of youth participation) used descriptive statistics to summarise participation rates by sub-county and demographic group, and a chi-square test of independence to assess the association between demographic/socioeconomic characteristics and participation status, whereas binary logistic regression identified socio–economic factors influencing participation. Analysis of Objective 2 (capacity of youth) used descriptive statistics to summarise self-reported knowledge levels of climate-smart agriculture practices before and

CC BY NC ND

Since 2001 ajfand AFRICAN JOURNAL OF FOOD, AGRICULTURE, NUTRITION AND DEVELOPMENT
SCHOLARLY, PEER REVIEWED
Volume 26 No. 9
October 2026
PUBLISHED BY AFRICAN SCHOLARLY SCIENCE COMMUNICATIONS TRUST
ISSN 1684 5374

after programme participation, and binary logistic regression assessed factors associated with improved knowledge following programme participation.

Ethical Approval

The research sought the approval of the Ethical Review Committee, JOOUST Postgraduate School, and National Commission for Science, Technology and Innovation (NACOSTI) before commencement of the study. Participation was voluntary, informed consent was obtained from all respondents, and confidentiality and anonymity were maintained throughout the study.

RESULTS AND DISCUSSION

Demographic and Socio–economic characteristics of respondents

Table 1 presents the demographic and socio-economic characteristics of the 302 youths who participated in the study. Slightly more than half of the respondents were female (53.0 %), while males accounted for 47.0 %. Nearly half (49.7 %) were aged 18–25 years, followed by those aged 26–30 years (25.8 %) and 31–35 years (24.5 %). Most respondents had attained secondary education (56.0 %), whereas relatively few had university (5.6 %) or TVET (4.6 %) qualifications. The majority (92.1 %) reported having access to agricultural land, and 60.9 % earned less than KES 10,000 per month. Significant differences among sub-counties were observed for age (P = 0.02) and monthly income (P = 0.02), while gender, education level and land access did not differ significantly across the study area (Table 1).

Factors influencing participation of youth in climate-resilient agricultural extension programmes in Siaya County

The binary logistic regression analysis (Table 2) revealed that participation in climate-resilient agricultural extension programmes was primarily influenced by socio-economic characteristics rather than demographic factors. Education level, access to land, monthly income and sub-county of residence significantly affected youth participation, whereas gender and age did not. These findings suggest that participation is largely determined by youths' access to productive resources and opportunities rather than by biological or demographic characteristics. The results support the evidence that improving access to education, economic resources and extension opportunities is essential for increasing youth engagement in climate-resilient agriculture in Siaya County[15].

Access to agricultural land emerged as a key determinant of youth participation in climate-resilient agricultural extension programmes. Secure access to land provides youth farmers with opportunities to apply newly acquired knowledge, invest in improved technologies and obtain economic returns from agricultural production [16]. In contrast, youths without land are less likely to perceive immediate benefits from participating in extension activities because they have limited opportunities to

CC BY NC ND

Since 2001 ajfand AFRICAN JOURNAL OF FOOD, AGRICULTURE, NUTRITION AND DEVELOPMENT
SCHOLARLY, PEER REVIEWED
Volume 26 No. 9
October 2026
PUBLISHED BY AFRICAN SCHOLARLY SCIENCE COMMUNICATIONS TRUST
ISSN 1684 5374

implement recommended practices. Similar findings have been reported in Kenya, where insecure land tenure continues to constrain youth engagement in agriculture[17]. The results suggest that policies aimed at improving youths' access to productive resources, particularly agricultural land, could substantially strengthen participation in climate-resilient agricultural extension programmes in the county.

Education level significantly influenced participation in climate-resilient agricultural extension programmes, indicating that educational attainment enhances youths' ability to access, understand and utilise agricultural information. Youths with higher educational qualifications are more likely to appreciate the benefits of climate-resilient technologies, interact effectively with extension personnel and make informed production decisions. Consequently, they are better positioned to participate in organised extension activities than youths with lower educational attainment. Similar observations have been reported in studies conducted in Kenya and other sub-Saharan African countries, where education consistently improves technology uptake and participation in agricultural development initiatives [18,19]. These findings underscore the importance of strengthening agricultural education, vocational training and youth capacity-building programmes to improve participation in climate-resilient agriculture.

Monthly income positively influenced participation, demonstrating that financial capacity plays an important role in determining whether youths engage in climate-resilient agricultural extension programmes. Youth with higher incomes are better able to purchase agricultural inputs, adopt improved technologies and meet the costs associated with implementing climate-smart agricultural practices. Consequently, they are more likely to participate actively in extension programmes than youths with limited financial resources. Similar relationships have been reported among smallholder farmers in several African countries, where access to financial capital enhances adoption of agricultural innovations[20,21]. These findings emphasise the importance of complementing extension services with financial inclusion initiatives such as youth credit schemes, savings groups and agricultural enterprise support programmes.

The significant variation in participation across sub-counties demonstrates that local contextual factors influence the effectiveness of climate-resilient agricultural extension programmes. Differences in extension service coverage, institutional support, development partner activities, infrastructure and opportunities for youth engagement are likely to contribute to the observed geographical variation. These findings indicate that county-wide extension programmes should not adopt a uniform implementation approach. Rather, interventions should be tailored to the specific socio-economic and institutional circumstances of individual sub-counties to maximise youth participation and programme effectiveness.

CC BY NC ND

Since 2001 ajfand AFRICAN JOURNAL OF FOOD, AGRICULTURE, NUTRITION AND DEVELOPMENT
SCHOLARLY, PEER REVIEWED
Volume 26 No. 9
October 2026
PUBLISHED BY AFRICAN SCHOLARLY SCIENCE COMMUNICATIONS TRUST
ISSN 1684 5374

Overall, the findings demonstrate that a combination of educational, economic and institutional factors shapes youth participation in climate-resilient agricultural extension programmes. Participation is determined not only by the availability of extension programmes but also by young people's capacity to access productive resources and utilise extension information effectively. These results highlight the need for integrated policies that simultaneously strengthen agricultural extension services, improve access to productive assets and enhance youth economic empowerment to achieve sustainable agricultural development and climate resilience.

Factors Influencing Knowledge of Climate-Smart Agricultural Practices after Participation in Climate-Resilient Agricultural Extension Programmes

The binary logistic regression analysis (Table 4) indicated that none of the socio-demographic characteristics significantly influenced the level of knowledge acquired after participation in climate-resilient agricultural extension programmes ($P > 0.05$). Similarly, the different modes of participation in extension activities were not statistically significant predictors of knowledge improvement. Nevertheless, respondents who reported receiving sufficient training and those involved in participatory activities such as field demonstrations, baseline surveys and farmer field schools were more likely to report improved knowledge than their counterparts.

Although these associations were not statistically significant, they suggest that the quality and intensity of extension engagement may play an important role in enhancing youths' technical capacity. Practical and participatory learning approaches expose youth farmers to hands-on experiences that facilitate knowledge acquisition and strengthen confidence in implementing climate-smart agricultural practices. Similar observations have been reported in studies examining participatory agricultural extension approaches, where experiential learning has been associated with improved farmer knowledge and technology adoption[22].

The absence of statistically significant socio-demographic effects further suggests that climate-resilient agricultural extension programmes in Siaya County have the potential to benefit youths irrespective of their age, education level or place of residence. This finding demonstrates that well-designed extension programmes can contribute to equitable knowledge development among rural youths when opportunities for participation are provided.

Overall, the findings indicate that improving the quality, frequency and practical orientation of extension activities may be more important for enhancing youths' knowledge than their socio-economic background. Continued investment in participatory extension methods such as demonstration plots, farmer field schools and regular extension visits is therefore likely to strengthen the effectiveness of climate-resilient agricultural extension programmes.

CC BY NC ND

Since 2001 ajfand AFRICAN JOURNAL OF FOOD, AGRICULTURE, NUTRITION AND DEVELOPMENT
SCHOLARLY, PEER REVIEWED
Volume 26 No. 9
October 2026
PUBLISHED BY AFRICAN SCHOLARLY SCIENCE COMMUNICATIONS TRUST
ISSN 1684 5374

Spatial Variation in Youth Participation across sub-Counties

The standardized residual analysis (Table 3) was undertaken to identify the specific sub-counties contributing to the significant association between geographical location and participation in climate-resilient agricultural extension programmes. Bondo Sub-county recorded significantly higher participation than expected, whereas Rarieda showed comparatively lower participation. The remaining sub-counties did not deviate substantially from the expected frequencies.

These findings suggest that local institutional and socio-economic conditions influence participation in climate-resilient agricultural extension programmes. Differences in extension coverage, access to agricultural services, development interventions and local leadership may explain the observed spatial variation. Consequently, county governments should strengthen support in areas with comparatively lower participation while maintaining successful approaches in sub-Counties demonstrating higher levels of youth engagement.

CONCLUSION AND RECOMMENDATIONS FOR DEVELOPMENT

This study examined youth participation in climate-resilient agricultural extension programmes and assessed the capacity of youths in Siaya County, Kenya. The findings demonstrated that youth participation was significantly influenced by education level, access to agricultural land, monthly income, and geographical location. The study also established that although many youths participated in climate-resilient agricultural extension programmes, significant knowledge gaps existed in several climate- resilient farming practices, highlighting the need for ongoing technical assistance and capacity building.

The findings highlight the necessity of building youth-responsive agricultural extension systems that promote involvement while also improving access to productive resources and practical knowledge. Addressing these socioeconomic barriers can help Siaya County's rural farming communities adopt more climate-resilient agricultural systems, raise agricultural productivity, and strengthen their overall resilience.

County governments and agricultural extension agencies should improve youth-responsive extension programmes by increasing practical training, farmer field schools and demonstration plots that help youth farmers gain technical knowledge and participate in climate-resilient agriculture.

Policymakers should design interventions to promote youths' access to productive resources, notably agricultural land, low - interest loans, high-quality farm inputs, and stable markets, as these characteristics have a substantial impact on involvement in extension programmes. In addition to that, youths should be involved

CC BY NC ND

in policy design, from design to implementation, so that the designed policies are youth responsive.

Further studies should focus on conducting comparative studies across several counties in Kenya to determine whether the socioeconomic factors influencing youth participation observed in Siaya County are also applicable across these geographic locations.

ACKNOWLEDGEMENTS

This study was supported by the World Bank through the Inter–University Council for East and Southern Africa (IUCEA) additional financing project.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

CC BY NC ND

ajfand Since 2001
AFRICAN JOURNAL OF FOOD, AGRICULTURE, NUTRITION AND DEVELOPMENT
SCHOLARLY, PEER REVIEWED
Volume 26 No. 9
October 2026
PUBLISHED BY AFRICAN SCHOLARLY SCIENCE COMMUNICATIONS TRUST
ISSN 1684 5374

Table 1: Demographic and Socio-Economic Characteristics of Respondents

Demographic and Socio-economic characteristics	Sub-counties						Total	X^2	df	p-value
	AU	BO	GE	RA	UGE	UGU				
Number of Respondents	53	40	64	45	64	36	302			
Gender								7.67	5	0.18
Female	32	20	37	16	36	19	160			
Male	21	20	27	29	28	17	142			
Age								21.00	10	0.02
18-25	23	20	39	23	31	14	150			
26-30	11	15	9	15	20	8	78			
31-35	19	5	16	7	13	14	74			
Education level								19.60	20	0.48
Diploma	9	6	5	2	8	3	33			
Primary	11	4	16	14	14	10	69			
Secondary	26	24	37	24	38	20	169			
TVET	2	3	1	3	2	3	14			
University degree	5	3	5	2	2	0	17			
Land Access								16.27	5	0.05
Have Access	48	36	63	37	61	33	278			
No access	5	4	1	8	3	3	24			
Monthly Income								36.03	20	0.02
Less than 10,000	29	16	48	24	47	20	184			
10,001-20,000	11	12	12	14	10	11	70			
20,001-30,000	4	7	2	1	3	4	21			
30,001-40,000	4	4	1	3	2	0	14			
More than 40,000	5	1	1	3	2	1	13			

AU=Alego-Usonga, BO=Bondo, GE=Gem, UGE=Ugenya, UGU=Ugunja

CC BY NC ND

ajfand Since 2001
AFRICAN JOURNAL OF FOOD, AGRICULTURE, NUTRITION AND DEVELOPMENT
SCHOLARLY, PEER REVIEWED
Volume 26 No. 9
October 2026
PUBLISHED BY AFRICAN SCHOLARLY SCIENCE COMMUNICATIONS TRUST
ISSN 1684 5374

Table 2: Factors Influencing Participation of Youth in Climate-Resilient Agricultural Extension Programmes in Siaya County

Variable	Estimate (SE)	Odds ratio [95 % CI]	P-Value
Gender (ref: Female)			
Male	-0.25 (0.31)	0.78 [0.42, 1.44]	0.425
Age (ref: 18-25)			
26-30	0.44 (0.39)	1.56 [0.73, 3.43]	0.258
31-35	0.43 (0.39)	1.53 [0.72,3.37]	0.274
Education (ref: Diploma)			
Primary	-1.62 (0.71)	0.20 [0.04,0.70]	0.022*
Secondary	-1.12 (0.67)	0.33 [0.07,1.06]	0.093
University	-1.03 (0.91)	0.35 [0.05,2.11]	0.256
TVET	-2.87 (0.94)	0.06 [0.01,0.32]	0.002**
Access to Land (ref: Have access)			
No Access	-1.13(0.52)	0.32 [0.11,0.90]	0.03*
Monthly Income (ref: less than 10,000)			
10,001-20,000	1.00 (0.40)	2.72 [1.26,6.20]	0.013*
20001-30000	0.79 (0.70)	2.20 [0.62,10.60]	0.260
30001-40000	1.62 (1.10)	5.07 [0.85,97.46]	0.137
More than 40000	1.60 (0.86)	4.94 [1.09,36.32]	0.061
Subcounty (ref: Alego usonga)			
Bondo	1.51 (0.63)	4.54 [1.39,17.41]	0.017*
Gem	0.53 (0.44)	1.69 [0.71,4.08]	0.233
Rarieda	0.11 (0.49)	1.11 [0.42,2.95]	0.827
Ugenya	0.38 (0.45)	1.47 [0.61,3.53]	0.391
Ugunja	1.35 (0.59)	3.86 [1.28,13.03]	0.021*
Constant	1.32 (0.72)		
Model χ^2	52.44, p<0.05		
Pseudo R^2	0.14		
N	302		

CC BY NC ND
https://doi.org/10.18697/ajfand.156.26615

Since 2001 ajfand AFRICAN JOURNAL OF FOOD, AGRICULTURE, NUTRITION AND DEVELOPMENT
SCHOLARLY, PEER REVIEWED
Volume 26 No. 9
October 2026
PUBLISHED BY AFRICAN SCHOLARLY SCIENCE COMMUNICATIONS TRUST
ISSN 1684 5374

Table 3: Standardized Residuals from Chi-Square Test of Participation in Climate-Resilient Agricultural Extension Programmes across Sub-Counties in Siaya County

Subcounty	Participants Residual	Non-participants Residual
Alego-Usonga	-0.99	+0.99
Bondo	+2.39	-2.39
Gem	-0.26	+0.26
Rarieda	-1.87	+1.87
Ugenya	-0.57	+0.57
Ugunja	+1.75	-1.75

Table 4: Factors influencing the level of knowledge in climate-smart agricultural practices in climate–resilient agricultural extension programmes

Variable	Estimate (SE)	Odds ratio [95% CI]	P-Value
Age (reference: 18-25)			
26-30	-0.06 (0.35)	0.94 [0.48, 1.85]	0.86
31-35	0.10 (0.37)	1.11 [0.53,2.31]	0.78
Education (reference; Diploma)			
Primary	-0.04 (0.51)	0.97[0.36,2.64]	0.94
Secondary	-0.09 (0.41)	0.91[0.41,2.10]	0.83
TVET	-0.79 (0.89)	0.45[0.07,2.48]	0.37
University	0.13 (0.60)	1.14[0.35,3.72]	0.83
Subcounty (Reference; Alego Usonga)			
Bondo	-0.75 (0.48)	0.47[0.18,1.20]	0.12
Gem	-0.05(0.43)	0.96[0.41,2.24]	0.92
Rarieda	-0.02(0.52)	0.99[0.36,2.74]	0.98
Ugenya	-0.26(0.44)	0.77[0.32,1.82]	0.55
Ugunja	0.52 (0.51)	1.68[0.63,4.60]	0.30
Training (Reference; Not sufficient)			
Somewhat sufficient	0.36 (0.35)	1.44 [0.72,2.89]	0.30
Sufficient	0.67(0.40)	1.95 [0.90,4.27]	0.09

CC BY NC ND
https://doi.org/10.18697/ajfand.156.26615

ajfand Since 2001
AFRICAN JOURNAL OF FOOD, AGRICULTURE, NUTRITION AND DEVELOPMENT
SCHOLARLY, PEER REVIEWED
Volume 26 No. 9
October 2026
PUBLISHED BY AFRICAN SCHOLARLY SCIENCE COMMUNICATIONS TRUST
ISSN 1684 5374

Modes of participation in extension programmes			
In-person training sessions	0.81(0.54)	0.45 [0.15,1.29]	0.14
Receiving farm visits from extension officers	0.17(0.31)	1.18 [0.65,2.16]	0.58
Implementing climate-resilient practices on own farm	0.25 (0.31)	1.29[0.69,2.38]	0.42
Participating in youth groups involved in agricultural extension	-0.11(0.29)	0.89 [0.49,1.61]	0.71
Sharing knowledge with other youths	-0.12 (0.34)	0.88 [0.46,1.70]	0.71
Data collections/ baseline survey/PRA /field demonstrations, farmer field schools	0.58 (0.39)	1.78 [0.83,3.85]	0.14
Constant	1.32 (0.72)		
Model χ^2	44.31, $p \leq 0.05$		
Pseudo R^2	0.15		
N	216		

CC BY NC ND
https://doi.org/10.18697/ajfand.156.26615

ajfand Since 2001
AFRICAN JOURNAL OF FOOD, AGRICULTURE, NUTRITION AND DEVELOPMENT
SCHOLARLY, PEER REVIEWED
Volume 26 No. 9
October 2026
PUBLISHED BY AFRICAN SCHOLARLY SCIENCE COMMUNICATIONS TRUST
ISSN 1684 5374

REFERENCES

1. **Kenya National Bureau of Statistics (KNBS**). 2019 Kenya Population and Housing Census Reports. Nairobi, Kenya; 2020. Available from: https://www.knbs.or.ke/2019-kenya-population-and-housing-census-reports/ *Accessed September 2025.*

2. **Nyasimi M, Kimeli P, Sayula G, Radeny M, Kinyangi J and C Mungai** Adoption and Dissemination Pathways for Climate-Smart Agriculture Technologies and Practices for Climate-Resilient Livelihoods in Lushoto, Northeast Tanzania. *Climate*. 2017; 15;**5(3**): 63. https://doi.org/10.3390/cli5030063

3. **Osumba J, Recha J and G Oroma** Transforming Extension and Service Delivery through Bottom-Up Climate Resilient Farmer Field School Approach to Agribusiness in Eastern Africa. *Biology*. 2021. https://doi.org/10.20944/preprints202102.0070.v1

4. **Ndung'u S, Ogema V, Thiga M, Kabarak University and P Wandahwa** Factors influencing the adoption of climate-smart agriculture practices among smallholder farmers in Kakamega County, Kenya. *Afr J Food Agric Nutr Dev*. 2023; **23(10)**: 24759–24782. https://doi.org/10.18697/ajfand.125.23400

5. **Tembo R and E Kibuka-Sebitosi** Effects of the agricultural food security pack programme in Zambia: the case of Mpulungu District. *Afr J Food Agric Nutr Dev*. 2023; **23(10)**: 24986–25005. https://doi.org/10.18697/ajfand.125.23150

6. **Batonwero P, Degla P and B Agalati** Socioeconomic determinants of the creation of farm business by youth in north-western Benin. *Afr J Food Agric Nutr Dev*. 2022; **22(112)**: 20957–20973. https://doi.org/10.18697/ajfand.112.20265

7. **Effiong J and C Aboh** Effectiveness of agricultural extension models in food crop production in Cross River State, Nigeria. *Afr J Food Agric Nutr Dev.* 2024; **24(3)**: 25871–25881. https://doi.org/10.18697/ajfand.128.24285

8. **Mbakaya B, Ndengu DM, Tembo M, Mbukwa C and D Njera** A Cross-Sectional Study on Level of Participation of Women in Farm Decision Making Processes: Household Approach in Mzimba North, Malawi. 2024. https://doi.org/10.22004/AG.ECON.347747

CC BY NC ND

9. **Oluwatayo I and A Ojo** Agriculture and the youth population in Africa: An under-tapped resource for inclusive development. *Afr J Food Agric Nutr Dev*. 2024; **24(10)**: 24774–24789. https://doi.org/10.18697/ajfand.135.24235

10. **Ogenga JO, Ngaira JKW and EM Mugalavai** Examining the Relationship Between Drought Trends and Food Crop Production in Siaya County, Kenya. *J Kenya Natl Comm UNESCO*. 2025. https://doi.org/10.62049/jkncu.v5i2.287

11. **Wetende E, Olago D and W Ogara** Perceptions of climate change variability and adaptation strategies on smallholder dairy farming systems: Insights from Siaya Sub-County of Western Kenya. *Environ Dev.* 2018; **27**: 14–25. https://doi.org/10.1016/j.envdev.2018.08.001

12. **Food and Agriculture Organisation (FAO)**. Youth Employment in Agriculture as a Solid Solution to Ending Hunger and Poverty in Africa. 2018 Aug 21. Available from: https://www.fao.org/about/meetings/youth-in-agriculture/en/ *Accessed September 2025.*

13. **Kenya Climate Smart Agriculture Project. Kenya Climate Smart Agriculture Project (KCSAP).** Annual Report and Financial Statements. Government of Kenya / KCSAP; 2021. Available from: https://kcsap.go.ke/who-we-are *Accessed October 2025.*

14. **Orodi Odhiambo and S Mango** County Government of Siaya. Siaya County Youth Agribusiness Strategy: Empowered Youth Gainfully Engaged in the Agri-food Sector. 2022. https://doi.org/10.13140/RG.2.2.12082.00968

15. **Njeru LK** Youth in Agriculture: Perceptions and Challenges for Enhanced Participation in Kajiado North Sub-County, Kenya. *Greener J Agric Sci*. 2017; **7(8)**: 203–209. https://doi.org/10.15580/GJAS.2017.8.100117141

16. **Rogito J and E Makhanu** Access to Land and Youth Involvement in Agricultural Value Chains in Kenya. 2024; **11(1)**: 2185–2193. https://doi.org/10.30574/ijsra.2024.11.1.0239

17. **Njeru L, Gichimu B, Lopokoiyit M and J Mwangi** Influence of Kenyan Youth's Perception towards Agriculture and Necessary Interventions; a Review. *Asian J Agric Ext Econ Sociol*. 2015; **5(1)**: 40–45. https://doi.org/10.9734/AJAEES/2015/15178

CC BY NC ND

18. **Adeyanju D, Mburu J, Gituro W, Chumo C, Mignouna D and A Ogunniyi**. Assessing food security among young farmers in Africa: Evidence from Kenya, Nigeria, and Uganda. *Agric Food Econ.* 2023; **11(1)**: 4. https://doi.org/10.1186/s40100-023-00246-x

19. **Adesina TK and E Favour** Determinants of Participation in Youth-in-Agriculture Programme in Ondo State, Nigeria. *J Agric Ext.* 2016; **20(2)**: 104. https://doi.org/10.4314/jae.v20i2.8

20. **Ahaibwe G, Mbowa S and MM Lwanga** Youth Engagement in Agriculture in Uganda: Challenges and Prospects. *Research Series.* 2013; 48. https://doi.org/10.22004/ag.econ.159673

21. **Chandra B Suresh, Steven F, Kristin ED and S Nandita** Drivers of youth engagement in agriculture: Insights from Guatemala, Niger, Nigeria, Rwanda, and Uganda. *Intl Food Policy Res Inst.* 2021. 29 p.

22. **Turyasingura B and P Chavula** Climate-Smart Agricultural Extension Service Innovation Approaches in Uganda: Review Paper. *Int J Food Sci Agric*. 2022; **6(1)**: 35–43. https://doi.org/10.26855/ijfsa.2022.03.006

CC BY NC ND