

Research Article

Determinants of Agribusiness Diversification Among Women Agri-preneurs in Njoro and Molo Sub-Counties in Nakuru County, Kenya

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Abstract

Participating in agribusiness value chains is significant for growth and development of an economy. Women have been noted to have low participation in agribusiness activities as compared to men because women face challenges such as inaccessibility and ownership of assets, social cultural hindrances, lower market innovativeness and versatility factors. To reduce these challenges faced by women agri-preneurs, there is need to adopt agribusiness diversification to ensure the success of agribusiness enterprises. The aim of this study was to determine the factors that influence the number of agribusiness lines that female agri-preneurs participate in. This study was carried out in Njoro and Molo Sub-counties in Nakuru County, Kenya between March and August 2023. A standard Poisson regression model was carried out to examine the number of agribusiness lines that female agri-preneurs have to maximize revenue and spread risks associated with post production agribusiness activities such as selling, distribution and value addition of agricultural products. The study sampled 267 female in agribusinesses, both group participants and non-participants. Data processing was done using SPSS and STATA software. The results showed that age, education level, Leadership position, size of agribusiness enterprise, time taken in the agribusiness activities and ability of the female agri-preneurs to borrow loans positively influence the number of agribusiness lines that women agri-preneurs have.

Keywords

Agribusiness Value Chains, Women Agri-Preneurs, Agribusiness Diversification, Agribusinesses Lines, Post Production Agribusiness Activities

1. Introduction

Agribusiness refers to interrelated practices needed to move an agricultural product through the various phases such as from input suppliers until the agricultural good or service reaches the final consumer [1-4]. Agribusiness is important in economic growth and development in Kenya through; creation of employment to majority of women and youths, industrialization, food security, improved incomes, earns the

country foreign exchange and enhances both local and international peace and harmony [5, 6].

In getting the determinants of agribusiness value chain, participation factors such as diversification ensures efficiency and effectiveness in management of agribusiness value chain associated costs such as transaction costs. Agribusiness diversification refers to a business management strategy whereby a female

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agri-preneur decides to participate in selling, distribution and value- addition of more than one product (not the variations in the qualities of the same product) [7].

Women play an essential role in economic development through agribusinesses in the rural economy, especially growth in the Gross Domestic Product (GDP). However, women agri-preneurs face more challenges in starting, managing, and making decisions in post-production agri-value chains activities. These challenges include; inaccessibility and ownership of assets, social-cultural hindrances, versatility factors, and illiteracy in terms of innovation and market innovativeness [8].

These challenges faced by women agri-preneurs, therefore, call for agribusiness diversification. Agribusiness diversification plays a vital role in the operation and success of many firms and enterprises today. Participating in different agribusiness lines is essential for female agri-preneurs for it helps to attract new customers and also helps to bring past customers through creation of loyalty. According to [8], the major intention of participating in agribusiness diversification is to spread the risks associated with agribusiness related activities. [8] also highlighted that different agribusiness lines attract different incomes and potential consumers hence necessary for the development and growth of agribusiness enterprises.

As more countries participate in agribusiness value chains, Global Agribusiness Value Chains (GAVC) are developed which enables satisfaction of the global demand for food and other agricultural materials [9]. Global agribusiness value chains result in internationalization, leading to wealth and employment creation, foreign exchange, proper nutrition, poverty elimination, and food safety and security. It also expands on markets for the products [10]. The Agribusiness value chain sector also ensures the fulfillment of the Millennium Development Goals (MDGs) and a food-secure society globally [11]. This sector also fights global food insecurity and malnutrition by extending food shelf life [12].

Adoption of the 2030 Agenda for Sustainable Development (ASD) by the United Nations (UN) General Assembly that comprises 17 Sustainable Development Goals (SDGs) that need transformation changes in agribusiness value chains towards social, economic, and environmental sustainability [13]. There have been notable shifts in global production, distribution, and consumption of food due to transformations in global agri-value chains [14].

Despite the various benefits linked to agribusiness diversification, there is still scanty literature to show the factors influencing agri-preneurs in participating in agribusiness diversification. Although majority of participants in post-production agri-value chains have been noted to be women [15]. Based on the merits associated to agribusiness diversification, there is need for women involved in post-production agri-value chain activities to participate in different agribusiness lines for them to be able to compete favorably in price and market shares [16]. Having different agribusiness lines also helps to solve common business problems such as

reducing sales revenue and decreasing profits [17].

According to Nakuru County Integrated Development Plan, post-production agribusiness activities are the main source of revenue to the County government [18]. However, there are more male participants in the listed post-production activities than women in the County, despite the fact that women play a significant role in the same activities informally and also dominate in the population of the county. Both small and medium size agribusiness enterprises exist in this county with a few large enterprises. Njoro and Molo Sub-counties have been classified as those regions that are very suitable for agricultural activities and most agribusiness activities. Women from these areas participate in groups and play a big role in ensuring that post-production agri-value chain activities remain effective. However, most of the micro and medium enterprises from there two sub-counties are unregistered only with a few registered Nakuru CIDP, 2018.

According to [19], if the market of an agribusiness product declines, the best way to respond is not cutting costs, but it is through desperately searching for a new agribusiness line to keep the agribusiness enterprise growing. The concept of agribusiness diversification has a long history from the Colonial period when cooperatives were developed with different objectives. There has been a rise in stakeholders championing group formation, (in particular women and youth groups) to respond to additional trading measures along the agribusiness value chain. Studies have shown that diversification participation has an effect on: economic value of a country [20], farm household welfare [21], achieving agricultural food security [22], on trade [23] and diverse approaches of diversification [24].

Despite the many studies on the diversification in agribusinesses, there still exists scanty literature on the determinants of agribusiness diversification on women agri-preneurs. This study, therefore, sought to fill this knowledge gap by studying the determinants of agribusiness diversification among women agri-preneurs involved in post- production activities such as selling, distribution and value- addition of agricultural products.

2. Materials and Methods

2.1. Study Area

The study was carried out in Njoro and Molo Sub-counties of Nakuru County. Nakuru County covers an area of 7496.5 km² with an approximate population size of 2,162,202, according to the Kenya population and housing census (2019). The main agricultural products produced in this county are mainly maize, beans, Irish potatoes, wheat, and horticultural products such as vegetables, flowers, and fruits. Livestock reared includes cattle, sheep, goats, and poultry. Nakuru County receives rainfall throughout the year, with much rain experienced in April, May, and August. There is less rain in January and February received in Nakuru County; rainfall

ranges between 22mm and 143mm. Njoro and Molo sub-counties cover approximately 713km² and 478.79km² respectively. Njoro Sub-county lies at 0.3305 °S, 35.9434 °E while Molo Sub-county lies at 0.2471 °S, 35.7374 °E. The population size of Njoro sub-county is 208,300, while that of Molo sub-county is 156732 (Census, 2019). The study also focused on two wards in every sub-county. In Njoro,

Mau-Narok and Mauche wards were considered, and in Molo sub-county, Elburgon and Molo wards were considered. The study wards have women who predominantly depend on agribusiness activities. There also exist groups in the identified wards. The map of the study area is shown in Figure 1 below:

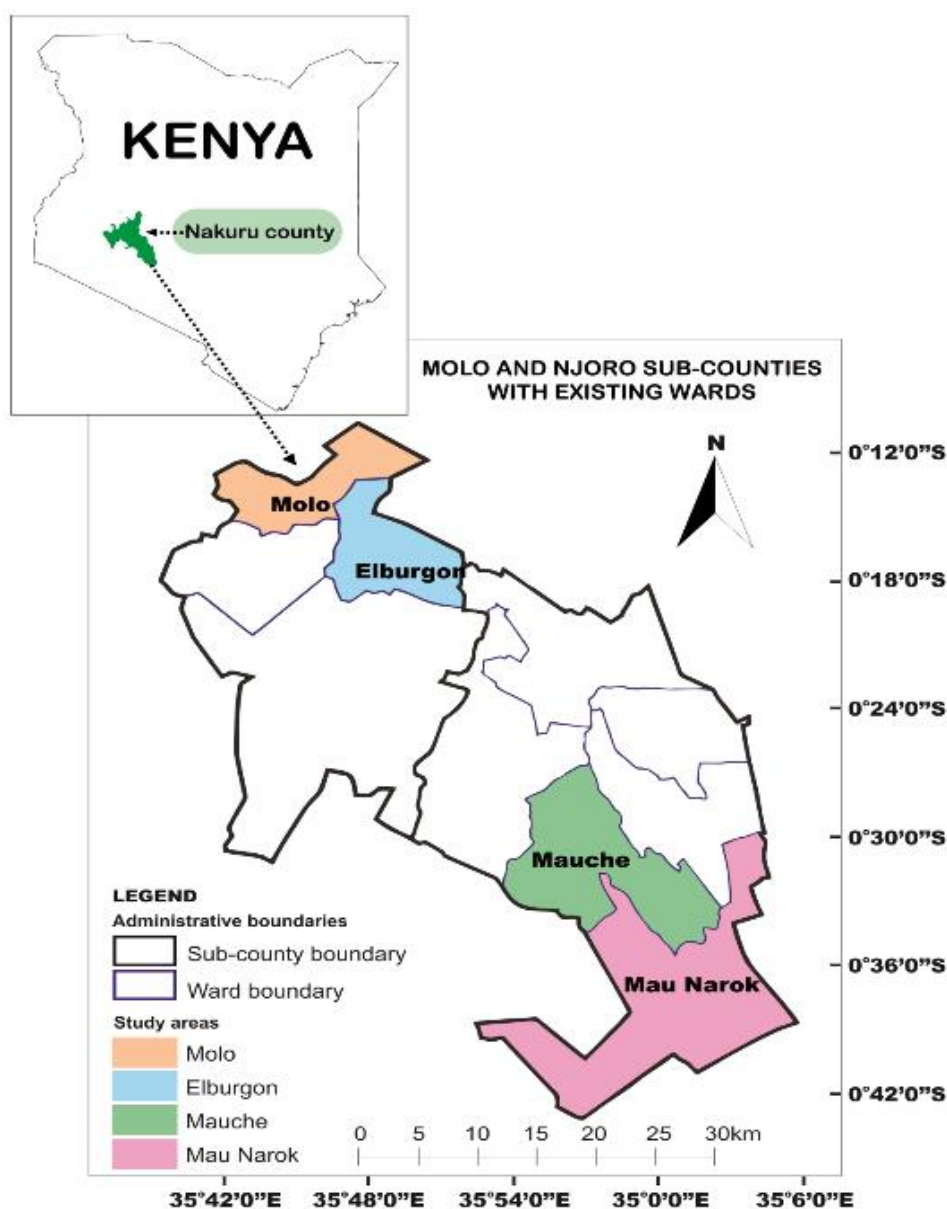


Figure 1. Map of the Study Area (Molo and Njoro Sub-Counties).

2.2. Sampling

This study was focused on women who participate in agribusiness activities. Female agripreneurs participating in groups and non-participants made up the study's target population. Cochran's formula (1977) was applied in obtaining

the sample size. This is because it calculates an ideal sample size given a desired level of precision, desired confidence level, and the estimated proportion of the attribute present in the population. Although there were other alternative methods of sample size determination Cochran's for this case was suitable as shown below:

$$n = \frac{Z^2 Pq}{e^2} \quad (1)$$

$$n = \frac{1.96^2 \times 0.5 \times 0.5}{0.06^2} = 267 \quad (2)$$

where; n is the desired sample size from the target population; Z is the normal standard deviation at the required confidence level of 95% ($Z=1.96$); p is the proportion in the target population assumed to contain the desired characteristics (Female agripreneurs who participate in either formal or informal groups) ($p=0.5$); q is the proportion in the target population assumed not to contain the characteristics (Female agripreneurs who are non-participants of either formal or informal groups), $q=(1-p)=0.5$; and e is the acceptable margin error ($e=0.06$). A bigger error has been used for diversify in the women because the women targeted in this study participate in many types of activities.

To obtain impact estimates generalizable to the target population, comparison units were pooled to have a reasonable number of observations with features corresponding to those of the treated (group participants) units (Heinrich *et al.*, 2010). Based on this argument, therefore, a higher sample size for untreated (group non-participants) 60% were used to avoid bias and to optimize estimation of treatment effects as shown in the table below based on the information given by agricultural officers from both sub-counties on women participating in agribusinesses:

Table 1. Proportionate Sample Distribution.

Wards	Populations	Treated (40%)	Untreated (60%)	Total
Njoro Sub-County				
Mauche Ward	4999	30	45	75
Mau Narok Ward	5051	30	46	76
Molo Sub-county				
Molo Ward	3900	23	35	58
Elburgon ward	3847	23	35	58
Total	17797			267

2.3. Data Collection

The study used primary data. The Primary data was collected using semi-structured administered questionnaire. A pilot study was conducted to test the validity of the questionnaire by interviewing 25 women agripreneurs in Kerinet ward in Kuresoi- South sub-county in Nakuru County. Well-trained enumerators did the data collection process. Semi-structured questionnaires were used because they gave room for more information for the study. The study also involved many respondents, making this method appropriate. The questionnaire consisted of general information about the female agripreneurs, such as age, education level, size of the household, employment status, agribusiness experience, decision making, any leadership role, group perception, any past experience about group participation, type of the agribusiness enterprise, size of the enterprise in terms of income, number of business lines, source of funds for the enterprise, government's role, credit accessibility, market and technology accessibility.

3. Results and Discussions

This objective was analyzed using Standard Poisson Regression Model because the dependent variable number of agribusiness lines for this case consists of count data in whole numbers or integers. The dependent variables used consisted of continuous, ordinal or nominal scale. The ordinal and nominal independent variables are broadly classified as categorical variables. The model information Table in the Appendix confirms that the dependent variable is "number of agribusiness lines", the probability is the "Poisson" and the link function is natural logarithm ("Log").

Looking into the goodness of fit Table 2 below, at the value/df column of the Pearson Chi-Square row, the value is 1.926 which is then interpreted as that the model does fit the data well hence the results can be interpreted ($P=.05$). Also the Pearson Chi-Square can be proves the assumption of equidispersion. A value of 1 indicates equidispersion assumption of the Poisson regression but a greater than 1 value (1.926) indicates over-dispersion but the most common violation of this assumption is over-dispersion.

Table 2. Goodness of fit.

Goodness of Fit ^a			
	Value	Df	Value/df
Deviance	489.798	249	1.967
Scaled Deviance	489.798	249	
Pearson Chi-Square	479.647**	249	1.926
Scaled Pearson Chi-Square	479.647	249	
Log Likelihood	-757.324		
Akaike's Information Criterion (AIC)	1564.648		
Finite Sample Corrected AIC (AICC)	1569.89		
Bayesian Information Criterion (BIC)	1654.977		
Consistent AIC (CAIC)	1679.977		

***, **, * =level of significance at 1%, 5% and 10% respectively.

The likelihood ratio Chi-square test indicates that the full model was a significant improvement in fit over a null (no predictors) model ($p < .01$) as shown in Table 3 below:

Table 3. Omnibus test.

Omnibus Test ^a		
Likelihood Ratio Chi-Square	Df	Sig.
810.942***	24	.000

***, **, * =level of significance at 1%, 5% and 10% respectively

Age of the female agripreneurs ($P = .020$), education level ($P = .003$), leadership position that women agripreneurs hold in the community ($P = .003$), size of the agribusiness enterprise in terms of income ($P = .000$), time taken by the female

agripreneurs in the agribusiness activity ($P = .000$) and ability of the female agripreneurs to access loans ($P = .000$) independent variables were statistically significant ($P = .05$). However, the independent variables such as employment status of the female agripreneurs ($P = .163$), decision making in the agribusiness enterprise ($P = .197$), perception about group participation ($P = .287$), availability of the business partner ($P = .399$), experience about group participation ($P = .299$), type of agribusiness enterprises (selling $P = .549$, value addition $P = .391$, and distribution $P = .359$), government support ($P = .126$), source of funds for the agribusiness enterprise (savings $P = .296$, credit $P = .221$ and donations and grants $P = .635$), size of the household ($P = .367$) and use and access to technology ($P = .700$) were not statistically significant. The market availability independent variable was not able to be computed hence (.) symbol was displayed as shown in Table 4 below.

Table 4. Tests of model effects.

Tests of Model Effects			
Source	Type III	Df	Sig.
	Wald Chi-Square		
(Intercept)	32.749	1	0.000
Education level of female agripreneurs	13.813**	3	0.003
Employment status of Female Agri-preneur	1.951	1	0.163

Tests of Model Effects

Source	Type III	Df	Sig.
	Wald Chi-Square		
Who makes decisions about agribusiness	4.682	3	0.197
Hold leadership position	8.703**	1	0.003
Perception of group perception	1.134	1	0.287
Do you have any business partner	0.712	1	0.399
Experience about group membership	1.079	1	0.299
Selling	0.359	1	0.549
Value addition	0.735	1	0.391
Distribution	0.841	1	0.359
The size of agribusiness enterprise in terms of income per month	131.934**	1	0.000
Savings as a source of fund	1.092	1	0.296
Credit as a source of fund	1.496	1	0.221
Donations and Grants as a source of fund	0.226	1	0.635
Government support to group participation	2.339	1	0.126
Able to borrow a loan	27.294**	1	0.000
Is the market for your agribusiness available	. ^a	.	.
Are you able to use and access technology	0.148	1	0.700
Age of the Female Agripreneurs	5.406**	1	0.020
Size of the house hold	0.815	1	0.367
Time in agribusiness activity	12.233**	1	0.000

***, **, * =level of significance at 1%, 5% and 10% respectively.

The dot (.) means that the value could not be computed. It is often used for statistics of redundant parameters. In this case probably the variable “market availability” is constant, and then the corresponding parameter is redundant, as the intercept is there too.

A Poisson regression was run to predict the number of agribusiness lines that a female agripreneurs has based on age of the female agripreneurs, education level of the female agripreneurs, the female agripreneur’s household size, employment status of the female agripreneurs, who makes decisions about the agribusiness enterprise, the leadership position that the female agripreneurs holds in the community, the perception of the female agripreneurs towards group participation, presence of the business partner in the enterprise, the past experience of the female agripreneurs on group participation, time taken by the female agripreneurs in operating agribusiness activities, the type of business, size of business in terms of monthly income, the source of funds that a female agripreneurs used as capital, government sup-

port on women group participation, ability of the women agripreneurs to access loans, market and ability to use and access technology.

To determine and explain the interactions of the various independent variables with the dependent variable “number of agribusiness lines, the parameter estimates has to show the coefficient estimate (the “B” column) and the exponentiated values of the coefficients (the “Exp (B)” column) of the standard Poisson regression model. Exp (B) column explains the interpretations 1 being the constant as discussed below and shown in Appendix IV:

3.1. Age

There is a positive relationship between age of female agripreneur and the number of agribusiness lines owned. This is statistically significant at 5% significance level (Wald Chi-square =5.406, df=1, $P = .05$). Results indicate that an increase in age by 1 unit (year), increases the number of agribusiness lines by 0.995 times. This could be attributed to the

reasoning that the older the female agri-preneur gets the more experience they get within the agribusiness sector and the benefits and the risks associated with various agribusiness lines. Similar results were reported by [25], in developing countries like Kenya there is a positive and statistically significant association between the age of agri-preneurs and the performance of the enterprise. However, this study contradicts the study by [26], that states that young agri-preneurs are innovative, easily to adapt changes and risk takers. This can be attributed to the fact that young entrepreneurs participate more on agribusiness enterprise's performance than old entrepreneurs.

3.2. Education Level

There is a positive relationship between education level of female agri-preneur and the number of agribusiness lines owned. This is statistically significant at 5% significance level (Wald Chi-square =13.813, $df=1$, $P=.05$). Results show that the number of agribusiness lines will be more for a female agri-preneur with a higher education level. The number of agribusiness lines will be 0.700 times less for a female agri-preneurs who has no formal education, 0.805 times less for female agri-preneurs who have studied up to primary level and 0.749 times more for female agri-preneurs whose level of education is secondary level. Education level of female agri-preneurs is relatively related to skills, knowledge, motivation, self-confidence, commitment, problem solving skills and discipline that agri-preneurs have towards owning and running an agribusiness enterprise [26]. This study is consistent with the study done by [27], shows that it is expected that higher education level increases the ability to cope with weaknesses and threats of the enterprise. It also enables agri-preneurs to seize through the strengths and the opportunities. in the business enterprise. According to [28], higher education level is also associated with better decision making to manage an enterprise to reduce the possibility of business failure. A study by [29] indicated that entrepreneurs with higher education level succeed in running their enterprises than those with formal education.

3.3. Leadership Position in the Community

There is a positive relationship between leadership position of women agri-preneurs in the community and the number of agribusiness lines owned. This is statistically significant at 5% significance level (Wald Chi-square =8.703, $df=1$, $P=.05$). Results indicate that the number of agribusiness lines will be more for female agri-preneurs who hold leadership positions in the community. The number of agribusiness lines will be 0.847 times less when a female agri-preneurs does not hold any leadership position in the community, a statistically significant result, $P=.003$. Leadership among female agri-preneurs increases chances of exposure to more information, trainings and opportunities. These trainings may be related to markets, how to manage finances and businesses. Female agri-preneurs also

who are leaders, get to access different market entry points and access to various technologies for transforming their products to more useful products. A study that was done by [30] reported similar findings and stated that holding a leadership position in the community can be used as a measure of social capital because it gives the household formal and informal support and information dissemination.

3.4. Size of the Agribusiness Enterprise

There is a positive relationship between the size of the agribusiness enterprise and the number of agribusiness lines owned. This is statistically significant at 5% significance level (Wald Chi-square =131.934, $df=1$, $P=.05$). Results show that every female agri-preneur who owns a small agribusiness size, (<Ksh.15000) will have 0.470 times less agribusiness lines than those who own large enterprises (>Ksh.15000). A large agribusiness enterprise involves high capital and various lines of agribusinesses. Large agribusiness enterprises are characterized by high investment, huge profits, requires large markets and there is high use and adoption of new techniques. In most cases, large agribusiness enterprises adopt differentiation marketing strategy [31].

3.5. Time in Agribusiness Activity

There is a positive relationship between the time taken by female agri-preneur in running an agribusiness activity and the number of agribusiness lines owned. This is statistically significant at 5% significance level (Wald Chi-square =12.233, $df=1$, $P=.05$). Results indicate that the number of agribusiness lines will be 1.005 times more for every extra year that a female agri-preneurs takes in operating an agribusiness enterprise, a statistically significant result, $P=.000$. According to [32], it was concluded that the longer the time taken in entrepreneurial experience creates a positive impact on business performance. The experience one gains in running of a business for a longer period of time enables them to get knowledge and skills required to establish and exploit opportunities, assessing market trends and decisions pertaining customers' needs and competitors' moves [33]. According to [26], it is concluded that the more the years an entrepreneur takes to operate an enterprise, the more profitability of the enterprises.

3.6. Ability to Borrow Loans

There is a positive relationship between the ability of the female agri-preneur to borrow loans and the number of agribusiness lines owned. This is statistically significant at 5% significance level (Wald Chi-square =27.294, $df=1$, $P=.05$). Results indicate that the number of agribusiness lines will be 0.708 times less for female agri-preneurs who cannot be able to borrow loans for their agribusiness enterprises, a statistically significant result $P=.000$. Ability to borrow credits enables female agri-preneurs to access more incentives and

resources to grow and meet their day to day agribusiness expenses. Ability to borrow loans also gives room for adoption of more modern technologies among female agripreneurs [34]. According to the study that was done by [35], indicated that friends and family are the most common source of credit for many Kenyans. Most business people relied on ROSCAs Rotating Savings and Credit Association), ASCAS (Accumulating Savings and Credit Association) and other investments groups for loans.

4. Conclusion

The age, education level, Leadership position, size of agribusiness enterprise, time taken in the agribusiness activities and ability of the female agripreneurs to borrow loans positively influence the number of agribusiness lines that women agripreneurs have. This can be based on more experience, skills, knowledge and attitude that female agripreneurs get as they involve more in the post- production activities. Some of these experiences gained includes: proper customer service, risk management, financial literacy among others.

5. Recommendations

Based on the findings from this study, women agripreneurs are still less empowered in technology use and access in Njoro and Molo sub-counties in Nakuru County. Women agripreneurs need to have knowledge and skills on the innovations related to proper marketing of their agribusiness enterprises; how to learn from social media on customers' needs and outsmart their competitors. This will boost female agripreneurs business growth and expansion through gaining support from participating in policy making and investors to make the right technologies available for women agripreneurs. Also the findings reveal that government has less support on women groups especially the support benefits a few women and this was linked to most group leaders being corrupt and the support only benefiting them. The government should come up with better policies on how to ensure that every woman benefits from its support. The government can support women in groups through training, tax relaxation aid funds for because it has a greater benefit to women.

Abbreviations

ASD: Agenda for Sustainable Development
CIDP: County Integrated Development Plan
GAVC: Global Agri-Value Chains
GDP: Gross Domestic Product
MDGs: Millennium Development Goals
SPSS: Statistical Package for the Social Science
STATA: Statistics and Data
UN: United Nations

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Conflicts of Interests

The authors declare no conflicts of interests.

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