Predicting the adoption of improved cassava varieties in Sierra Leone

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In Sierra Leone cassava plays a major role in households' food and income security. Plant breeders have concentrated on improved varieties with an increasing yields per unit area. This study was designed to identify factors that influence adoption or rejection of improved cassava cultivars by growers. Data were collected using questionnaires, focus group discussions and field walks; locations were selected using multistage stratified random sampling. Logistic regression was used to model uptake of improved varieties. Most farmers usually grow several cultivars and just over half have included an improved variety. Of the six improved varieties released in 2005 by the Sierra Leone Agricultural Research Institute, only SLICASS 4, was widely adopted and three were not recorded in the study. Preferred characteristics are; high yield, sweet taste, early maturity and good cooking quality. Cultivars are more likely to be adopted where; cassava is a major crop, households are experienced in cultivating cassava, they have access to research, contact with extension agents and access to cassava markets. Improved cultivars are less likely to be adopted by small households with few resources. Cassava breeders should recognize what farmers find desirable but success will depend on; communicating research, having active extension agents and good access to markets.

Key words: Adoption, improved varieties, cassava, Sierra Leone.

INTRODUCTION

Sierra Leone is the second largest cassava producer in the Mano River Union region of West Africa that includes other countries like Guinea, Liberia and Côte d’Ivoire. The cultivation and sale of cassava is second only to rice in providing food and income to farmers, processors and traders. It is grown in all five agroecological zones sometimes as a monoculture but more often intercropped with rice and maize. Production has increased steadily in recent years from 3,250,044 tons in 2010, to 4,135,064 tons in 2014 (FAOSTAT, 2010, 2014). A majority of farmers in Sierra Leone grow local varieties which are low yielding, but the effect of cassava mosaic disease is thought to be a major constraint on productivity (Samura et al., 2014). The Sierra Leone Agricultural Research Institute (SLARI) released six improved cassava varieties (namely SLICASS 1 through 6) in 2005 (Massaquoi 2006 unpublished data). These varieties were among those provided by IITA and had

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undergone 10 years of trials prior to being selected for release by SLARI. In field trials, the varieties showed the potential for high yields, good resistance to multiple diseases and pests as well as possessed qualities for food, feed and industrial use (SLARI Unpublished data). Farmers in some parts of Africa including Sierra Leone broadly classify cassava varieties into “sweet” (those that can be eaten boiled or roasted) and “bitter” (those that have to be processed into fufu or gari). “Bitter” varieties have much higher precursors of cyanide, making them more resistant to pests and diseases and are generally higher yielding than “sweet” varieties (Chiwona-Karifun et al., 2014)

Although the combination of these new varieties with revised agronomic practices was expected to increase yields per unit area, the cassava productivity on smallholder farmers remained low. The low uptake rate of these varieties has often been blamed by researchers, NGOs and agricultural extension workers on; a lack of reliable distribution system, weakness of the extension services, and poor quality of the propagating materials. Despite the availability of these improved varieties, most farmers have continued cultivating local landraces known to be susceptible to diseases, late maturing and relatively low yielding. The decision of whether or not to adopt a new technology should hinge on a careful evaluation of a large number of technical, economic and social factors (Rogers, 1995). The choice of varieties to be introduced in a given environment should consider several criteria that are linked not only to specific characteristics of the varieties, but the context or system into which they will fit. For example, the socio-economic environment, production systems and marketing constraints are important criteria that affect the decision-making processes of farmers on adoption (Ojo and Ogunyemi, 2014; Sodjinou et al., 2015; Udoj and Kormawa, 2009). Several studies on innovation and technology dissemination highlight important factors affecting adoption of new crops. Several notable factors include; marital status, the farm size, the type of farmer, the education level, the contact with extension services, the farming experience, the cropping systems, the volume of production, access to processing facilities, access to credit, presence of non-farm incomes, and the existence of a market for the sale of products (Da Encarnação and Zwane, 2020; Mende et al., 2015; Ojo and Ogunyemi, 2014; Prager and Posthumus, 2010; Prokopy et al., 2008).

It has been observed over the years, the poor uptake of improved cassava varieties by farmers despite the perceived benefits of higher yield and low susceptibility to pests and diseases. Of the six varieties of cassava released by SLARI over the years, there have been no evaluations of the extent to which they have been widely adopted by farmers, and in doing so, understand the present study was designed to predict the determinants of adoption or rejection of six improved cassava varieties factors playing critical roles in the low uptake. The released in 2005 in the major cassava growing districts within Sierra Leone.

MATERIALS AND METHODS

The study was conducted in nine districts located in three regions of Sierra Leone; southern, eastern and northern provinces as depicted in Figure 1. Those regions were selected because they are reported to be major cassava growing areas (Samura et al., 2014).

Study population, design and sample size determination

Within each of the nine districts, three chiefdoms were selected at random, with a focus on one community in each of the chiefdoms. The study design was based on the multi-stage probability sampling procedure. The first stage involved the selection of the three regions (northern, southern and eastern), nine districts, three chiefdoms per district and three communities using the purposive sampling technique. The regions, districts and communities were purposively selected because of the high level of cassava production. Purposive sampling technique has been recommended in social research as it focuses directly on the area intended to be studied (Kothari, 2004). The second stage involved the random selection of respondents from the population by first developing a listing of the cassava farmers in each community. Cassava farmers were randomly selected from the list of cassava farmers in each community for individual interviews using structured questionnaires. Primary data was collected by conducting 405 personal interviews, 27 focus group discussions segregated by gender (adult male, adult female and youths). Data were collected using computer assisted personal interview (CAPI) method using android tablets on;

(i) the SLICASS varieties cultivated by the household,
(ii) socioeconomic characteristics (gender, age, marital status, educational status, household size, main crops cultivated by households and experience in growing cassava), and
(iii) farmer’s access to agricultural services (research, extension, training and market)

The sample size was determined based on Cochran’s formula (Cochran, 1977) for infinite population.

\[ n = \frac{z^2 p q}{e^2} \]

Where \( n \) is the sample size, \( z \) is the selected critical value of desired confidence level, \( p \) is the estimated proportion of an attribute that is present in the population, \( q = 1 - p \), and \( e \) is the desired level of precision.

To determine the sample size (\( n \)), it was assumed that the proportion of cassava farmers in the population was 50% (\( p = 0.5 \)), the desired level of precision was 5% (\( e = 0.05 \)) at 99% confidence level (\( z = 2.58 \)), and a response rate of 95%. Hence, the calculated sample size for the study was approximately 405 (15 cassava farmers per community) (Table 1).

ANALYTICAL FRAMEWORK FOR HYPOTHESIS TESTING

Description of variables

Modelling framework

Predicting the uptake of improved cultivars is modelled using multiple logistic regressions. Quantitative data from the household interviews was analyzed using Statistical Analysis Systems (SAS 9.4). Descriptive statistics was used to analyze the quantitative data related to the respondent’s profile, and access to agricultural inputs.
and services using PROC MEANS procedure of SAS. Regression analysis was used to determine the factors that may influence the adoption of improved cassava varieties to identify the determinants of adoption of improved cassava varieties adoption using PROC LOGISTIC of SAS.

**Dependent variable**

The dependent variables used in this study were the uptake of the six improved cassava varieties (SLICASS 1, 2, 3, 4, 5 and 6).

**Independent variables**

The independent variables used in this study were the household characteristics of cassava farmers. These include socioeconomic variables (gender, age, marital status, educational status, household size, main crop cultivated by household and experience in growing cassava) and access to services (research, extension, training and market). The description of the independent variables used in the hypothesis testing is presented in Table 2.

**Determinants of improved cassava variety adoption**

In this study, an adopter was defined as a cassava farmer who has grown any of the SLICASS varieties within the last three years of the study date. The adoption variable was measured as a binary variable (1 = Cassava farmer is an adopter of at least one SLICASS variety, and 0 = no improved cultivars grown). The logistic regression analysis was used to assess the household characteristics that determine the farmers’ adoption status of at least one SLICASS variety. The independent variables were both
Table 1. Distribution of sample size by region and districts.

| Region | District | Number of chiefdoms | Number of respondents per community | Total number of respondents |
|--------|---------|---------------------|------------------------------------|-----------------------------|
| East   | Kailahun| 3                   | 15                                 | 45                          |
|        | Kenema  | 3                   | 15                                 | 45                          |
|        | Kono    | 3                   | 15                                 | 45                          |
| North  | Bombali | 3                   | 15                                 | 45                          |
|        | Kambia  | 3                   | 15                                 | 45                          |
|        | Koinadugu| 3                   | 15                                 | 45                          |
| South  | Bonthe  | 3                   | 15                                 | 45                          |
|        | Pujehun | 3                   | 15                                 | 45                          |
| Total  |         | 9                   | 27                                 | 405                         |

Table 2. Description of independent variables used in the hypothesis testing.

| Variable                      | Definition                                                                 |
|-------------------------------|-----------------------------------------------------------------------------|
| Socioeconomic characteristics |                                                                             |
| Gender                        | 1 = Male farmer and 0 = female                                                |
| Age                           | Age of cassava the farmers in years                                         |
| Marital status                | 1 = cassava farmer is married; 0 = cassava farmer is not married            |
| Educational status            | 1 = cassava farmer had at least primary education; 0 = no formal education   |
| Household size                | Number of persons in the household                                          |
| Main crop cultivated          | 1 = cassava is the main crop; 0 = cassava a minor crop                      |
| Experience in growing cassava | Number of years the farmer has grown cassava                                |
| Access to services            |                                                                             |
| Research                      | 1 = farmer had access to research technologies for cassava; 0 = no access to research |
| Extension                     | 1 = cassava farmer had contact with extension agents; 0 = no access to extension |
| Training                      | 1 = farmer had training on cassava production; 0 = no training              |
| Market                        | 1 = farmer has good access to markets to sell cassava products; 0 = no or very limited access to markets |

continuous and discrete, which justifies the use of logistic regression model over the probit regression model. Hosmer and Lemeshew (1989) recommend the logistic distribution (logit) where the analysis is of a dichotomous outcome variable, and that it is extremely flexible and easily used model from mathematical point of view and results in a meaningful interpretation. Another advantage of using the logit model is that it does not require normally distributed variables and above all, the logit model is relatively easy to compute and interpret. Hence, the logistic model was selected for this study. The form of the logistic regression model is presented as:

\[ \ln \left( \frac{p}{1-p} \right) = \beta_0 + \beta_1 x_i + \varepsilon_i \]

where, \( \ln \) = natural logarithm; \( p = \) is the probability of the adoption of at least one SLICASS variety; \( \beta_0 = \) intercept; \( \beta_1 = \) vector of parameters; \( x_i = \) a vector of household characteristics and \( \varepsilon = \) error term.

RESULTS AND DISCUSSION

Rate and level of adoption of SLICASS varieties

Results from the study show that thirteen years after introduction, just over half of the cassava farmers (57.3%) interviewed in the study area has adopted at least one (almost always Slicass 4) of the six improved cassava varieties. However, the magnitude of adoption of improved cassava varieties was higher in the eastern region (63.7%), followed by the northern region (57.0%) and lowest in the southern region (51.1%).
differences in uptake of new varieties seems to be a combination of better access to markets and processing facilities, more emphasis on commercial production in the East, and better access to technical assistance.

The rate of adoption of the six SLICASS varieties is presented in Figure 2. The most predominant improved cassava variety adopted by farmers in the study area was SLICASS 4 (56.3%) followed by SLICASS 6 (15.3%). These two cassava varieties have desirable end-user traits (high yielding, good for processing into gari and other cassava products and resistant to the major cassava disease) that are important in increasing household food security and income.

Agwu and Anyaeche (2007) have earlier noted that farmers’ adoption of improved cassava varieties could be determined by the extent to which they possess desirable qualities. Such qualities could include high yield, enhanced shelf life, ease of harvest, color of peeled tuber, early maturity, pests and disease resistance and ability to suppress weeds. Thus, varieties that are not desirable to farmers will not be adopted, and adherence to the cultivation of local cassava varieties by farmers could derive from this. These traits may have influenced the widespread cultivation of SLICASS 4 and SLICASS 6 by farmers in the major cassava growing areas of Sierra Leone. Azilah (2007) reported that, the adoption of cassava technologies is important in increasing household food security in Ghana, Nigeria and Malawi. SLICASS 2, SLICASS 3 and SLICASS 5 have not been grown within the past three years by farmers in the study areas, and SLICASS 1 was adopted by less than 1% of farmers. Even though SLICASS 1 is high yielding, sweet and can be pounded easily, it is an early branching variety and not suitable for cassava-based intercropping systems. However, there is no farmer who grew more than one variety of the same category at the same time.

Profile of the cassava farmers

Descriptive analysis of the independent variables (profile of the cassava farmers) in the study area is shown in Table 3.

Socioeconomic characteristics

The study results showed that the majority (70.0%) of respondents engaged in cassava cultivation were males (Table 3). During the Focus Group Discussion (FGD), it was revealed that cassava cultivation was labor intensive and most of the activities were carried out by men. According to Oladeji et al. (2001), it is generally believed that males are often more energetic and could readily be available for energy demanding jobs like cassava farming. The result from this study relates to the findings observed by Nweke et al. (2001) who reported that women were found to contribute less than half of the total labor inputs in the cassava production system in five of the six Collaborative Study of Cassava in Africa (COSCA) countries. Majority (80%) of the cassava farmers interviewed in the study area were married, and most of the married farmers relied on cassava for several household needs such as food, cash for education, and health services. According to the World Bank (2009), marital status is said to influence farm practices, and these families can have more responsibilities than unmarried ones. Moreover, marital status has implication
on social organization and economic activities, such as agriculture and resource management, as well as adoption of cassava technologies. According to Mende et al. (2015), married couples are likely to be more productive than single persons due to labor supply and access to productive resources in agriculture. The results of the study showed that, the average age of the cassava farmers interviewed was 40 years, making adults to be mainly involved in the activity. During the FGD, it was revealed that youths were not interested in cassava farming and hence they engaged themselves in other activities like motor bike riding, petty trading and vocational skills that result in immediate cash benefits. The educational background of the cassava farmers interviewed was low, with only 30% having attained at least primary school level of education. According to Liberio (2012), farmers’ educational background is a potential factor in determining the readiness to accept and properly use advocated technologies. The average household size of cassava farmers interviewed was 7.7 persons. The number of people in a household may also influence the adoption of the technology, with bigger the household size, the higher the chance of adoption especially with access to more labor (Asmelash, 2014).

### Access to services

Half of the cassava growers in the study area had access to: research technologies (improved cassava varieties, and improved agronomic practices), extension agents, and markets to sell cassava products. The extension service is the most effective source of information flow to farmers on farming practices, innovations and technology. According to Liberio (2012), extension agent is the key person to train farmers on issues related to farming including dissemination of new technologies developed by research institutions. Different methods are

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**Table 3. Profile of cassava farmers in the study areas.**

| Socioeconomic characteristics       | Regions               | Study area         |
|-------------------------------------|-----------------------|--------------------|
|                                     | East                  | North              | South               | Mean | Std Dev |
| Gender (Male)                       | Mean | Std Dev | Mean | Std Dev | Mean | Std Dev | Mean | Std Dev |
| Age (Years)                         | 0.7    | 0.5     | 0.7    | 0.5     | 0.7    | 0.5     | 0.7    | 0.5 |
| Marital status (Married)            | 39.6   | 11.3    | 40.5   | 12.1    | 39.8   | 12.4    | 40.0   | 11.9 |
| Educational status (at least primary)| 0.9    | 0.3     | 0.6    | 0.5     | 0.9    | 0.3     | 0.8    | 0.4 |
| Household population                | 7.5    | 3.3     | 8.2    | 3.7     | 7.5    | 3.6     | 7.7    | 3.5 |
| Maincrop cultivated (cassava)       | 0.2    | 0.4     | 0.4    | 0.5     | 0.2    | 0.4     | 0.3    | 0.4 |
| Experience in growing cassava (Years)| 13.4   | 9.3     | 15.8   | 9.5     | 12.1   | 7.9     | 13.8   | 9.1 |
| Access research technologies        | 0.5    | 0.5     | 0.5    | 0.5     | 0.6    | 0.5     | 0.5    | 0.5 |
| Contact with extension agents       | 0.5    | 0.5     | 0.4    | 0.5     | 0.6    | 0.5     | 0.5    | 0.5 |
| Training on improved agronomic practices | 0.6    | 0.5     | 0.4    | 0.5     | 0.6    | 0.5     | 0.5    | 0.5 |
| Access to market to sell cassava products | 0.6    | 0.5     | 0.4    | 0.5     | 0.6    | 0.5     | 0.5    | 0.5 |

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**Table 4. Significant determinants in the adoption of improved cassava varieties: Logistic Regression.**

| Parameter                                      | Study area | Regions             |
|------------------------------------------------|------------|---------------------|
|                                                | East       | North               | South               |
|                                                | Est | Std error | Est | Std error | Est | Std error | Est | Std error |
| Intercept                                      | -3.6084***| 0.720         | -3.952***| 1.352       | -4.732***| 1.7371      | -4.2333**| 1.695       |
| Contact with extension agents                  | 2.1429*** | 0.282         | 2.2553***| 0.474       | 2.9178***| 0.8587      | 2.9891***| 0.699       |
| Access to research                             | 1.5556*** | 0.281         | 1.7162***| 0.536       | 2.6114***| 0.8431      | 1.5034***| 0.637       |
| Access to cassava markets                      | 1.3315*** | 0.283         | 0.4383  | 0.450       | 1.5137** | 0.7439      | 3.7415***| 0.763       |
| Experience in growing cassava                  | 0.0482*** | 0.017         | 0.0318  | 0.026       | 0.0321  | 0.0393      | 0.1481***| 0.049       |
| Maincrop cultivated                            | 0.6774**  | 0.280         | 0.474   | 0.475       | 1.1703  | 0.8089      | 1.8068***| 0.666       |
| Household population                           | 0.0799*   | 0.041         | 0.0986  | 0.071       | 0.1016  | 0.0941      | 0.0968   | 0.067       |
| Age                                            | -0.00838  | 0.012         | 0.0169  | 0.021       | -0.00878| 0.0309      | -0.0781**| 0.032       |

***, **, and * denotes significance at 1%, 5% and 10% respectively.
used to ensure that agricultural information and research results reach farmers. These methods include personal contacts, group methods such as meetings, demonstrations, farmers’ field days, farmers training and agricultural shows (Belay and Degnet, 2004). The Njala Agricultural Research Center (NARC), Ministry Agriculture and Forestry (MAF) and local and international NGOs have been distributing improved cassava varieties to farmers through on-farm trials and demonstration plots using farmer groups or individuals as a strategy to disseminate technologies. These efforts helped farmers acquire improved knowledge, skills and ultimately adopt technologies to increase cassava production and productivity as well as improve food security.

**Determinants of adoption of improved cassava varieties**

The results of the logit regression models on the determinants of adoption of improved cassava varieties are presented in Table 4. The F-test showed that the models were statistically significant at the 1% level, and the Wald tests of the hypothesis that all regression coefficients that are jointly equal to zero were rejected. This implies that explanatory variables used in the model were collectively able to explain the farmers’ decision regarding the adoption of cassava varieties in the study area (Hiko et al., 2020; Filho et al., 2011). Based on the results of the logistic regression model, the following are statistically significant factors in the adoption of improved varieties and all had positive and significant influence on the adoption of improved cassava varieties in the study area:

(i) contact with extension agents, (+2.143, p<0.001)
(ii) access to research outputs and activities, (+1.556, p<0.001)
(iii) access to cassava markets, (+1.332, p<0.001)
(iv) cassava being the main crop cultivated by the household, (+0.667, p<0.01)
(v) household size, (+0.0779, p<0.05)
(vi) experience growing cassava, (+0.0482, p<0.001)

At the regional level, access to research outputs and activities and contacts with extension agents had positive and significant influence on the adoption of improved cassava varieties in each region. Regional specific variables that significantly influenced the adoption of improved cassava varieties were access to research outputs and activities, and contacts with extension agents in the eastern region. In the northern region, access to research outputs and activities, contacts with extension agents and access to markets significantly influenced the adoption of improved cassava varieties, while in the southern region, it was age, cassava as the main crop cultivated by the household, experience in growing cassava and access to markets (Hiko et al., 2020; Da Encarnação and Zwane, 2020; Filho et al., 2011).

**Age**

There was a significant effect of age on farmer’s decision to adopt an improved cassava variety in the eastern region. Increasing the age of the farmers by one year decreased the probability of adopting improved cassava varieties by 7.81% in the eastern region. This suggests that the younger farmers are more likely to adopt improved cassava varieties than older farmers with the same level of experience, that is, younger farmers are more likely to innovate, and so are more experienced farmers. This disagrees with the findings of Islam et al. (2012) who indicated that older and hence experienced farmers readily adopt new technologies. The inverse relationship between age and adoption in the eastern region can be attributed to the fact that older farmers are used to their conventional ways of farming and might be reluctant to make such a switch, unlike young people who are associated with a higher risk-taking behavior and possibly more open to the use of newer technologies than their parents. Inconsistent with the findings of Da Encarnação and Zwane (2020), Danso-Abbeam et al 2017 and Obayelu et al. (2015), thier studies have reported that the older the farmer the more likely to adopt improved varieties. Filho et al. (2011) also disagreed and attested that, despite the fact that aged farmers have challenges to the access information on new technologies, they are fast to adopt new innovation, because they are more likely to assign substantial resources to its acquisition than the youths.

**Household size**

There was a significant increase (8%) in the probability of adopting improved varieties with larger households (greater than 10 members) compared to smaller households (five or less). The adoption of new technologies is often labor intensive, hence large households tend to have more labor supply towards the adoption of the innovation than smaller households. Kassie et al. (2013) reported that, larger household sizes may be associated with higher labor endowment, making such households more likely to adopt new technologies. A study by Sodjinou et al. (2015) have shown that, families with a substantial number of persons adopt new technologies more readily than those with a smaller number of persons (Hiko et al., 2020; Hassen et al., 2012).

**Main crop cultivated by household**

The cultivation of cassava as the main crop, and on average 13.8 years of experience cultivating cassava by a household had a significant and positive influence on a
farmer’s decision to adopt an improved cassava variety in the study area and especially in the southern region. A unit change in the number of cassava farmers who cultivate cassava as the main crop and experience of the household in cultivating cassava by one unit, increased the probability of adopting an improved cassava variety by 67.74% and 4.82%, respectively, when all other variables are held constant. This result shows that, cassava is a prominent crop in the study region especially in the southern region. This study is in support of the work done by Obayelu et al. (2015), who recorded that the main crop cultivated in the studied area is cassava especially Abeokuta and Ikenne of Nigeria.

Experience in cultivating cassava

The experience of the household in cultivating cassava had a significant effect on a farmer’s decision to adopt an improved cassava variety, especially in the southern region. A unit change in the number of years of cultivating cassava increased the probability of adopting an improved cassava variety by 4.82% when all other variables are held constant. Consistent with this study, Ojo and Ogunyemi (2014) found a significant positive relationship between experience and adopting new cultivars. However, at the same time, younger farmers are more likely to innovate and adoption of farm technology. Farmers with longer years of experience of cultivating cassava were reported to have the tendency to adopt new cassava varieties than less experienced farmers. Similar findings by Abdalla et al. (2013) and Obayelu et al. (2015) have indicated the experience of farmers to their choice of cassava varieties they adopt and maintain.

Access to research outputs and activities

Access to research outputs and activities had a significant and favorable control on a farmer’s decision to adopt an improved cassava variety in the study area and in each region. Holding all other factors constant, increasing farmers’ access to research outputs and activities by a unit increased the probability of adopting an improved cassava variety by 171.62% in the eastern region, 261.14% in the northern region, 150.34% in the southern region, and 155.56% in the study area. These findings support conclusions drawn by Hiko et al. (2020) and that provisions of inputs, knowledge and technical skills provided by policy makers helped in the adoption process.

Contact with extension agents

Contact with extension agents had a significant effect on a farmer’s decision to adopt an improved cassava variety. Holding all other factors constant, increasing farmers contact with extension agents by one, increased the probability of adopting an improved cassava variety by 225.53% in the eastern region, 291.78% in the northern region, 298.91% in the southern region, with an overall value of 214.29% for the study area. Mmbando and Baiyegunhi (2016) have reported a positive relationship between extension services and technology adoption. Contact with extension agents enhances the ability of farmers to acquire and use information required for cassava production and productivity. Farmers get a lot of information with regards to production and marketing from extension officers, as well as networking with other farmers. Also, it has been observed that regular contacts between producers and the extension service significantly reduces the use of local varieties and favor the uptake of improved varieties. Contact with extension agents could influence adoption as it allows access to information on the benefits of the new innovations and the released varieties (Wossen et al., 2017; Prager et al., 2008; Prager and Posthumus, 2010).

Access to cassava markets

Access to cassava markets had a significant impact on a farmer’s decision to adopt an improved cassava variety in the study area, as well as in the southern and northern regions. A unit change of farmer’s access to cassava markets increased the probability of adopting an improved cassava variety by 151.37% in the northern region, 374.15% in the southern region and 133.15% in the study area. Distance to markets is also used as a proxy for market accessibility in adoption studies. A farmer’s access to markets may influence the net benefits available from a technology and therefore, its likelihood of adoption (Langyintuo and Mungoma, 2008). In another study, Udo and Kormawa (2009) reported that distance to nearby markets was important in the adoption of cassava technologies. Nearby markets reduced transport costs for the farmers to get their produce to the market, and it therefore encouraged them to adopt the cassava technologies.

CONCLUSION AND RECOMMENDATIONS

Majority of farmers in the study have adopted at least one improved cassava variety. SLICASS 4 is the predominant cassava variety that has been adopted by farmers due to its desirable end user traits (yield potential, taste, high disease resistance, early maturity and good processing quality). The most important determinants of adoption of improved cassava variety in the three study areas are; access to research outputs and activities, contact with extension agents and access to cassava markets. Better understanding of factors determining the adoption of new cassava varieties would allow a better implementation of
policies for varietal selection and diffusion to meet the expectations of farmers. It is therefore important that cassava breeders give specific preferences to desirable end-user traits in their breeding program to ensure adoption by farmers. In addition, extension agents must make strong effort in motivating farmers to adopt improved cassava varieties in order to increase cassava production and household incomes of farmers in Sierra Leone. Most of the farmers in Sierra Leone have low educational background, which necessitates that extension workers endeavor to cultivate their interests in obtaining pertinent information from them as well as sharing research findings with them.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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