Journal of Agroecology and Natural Resource Management
p-ISSN: 2394-0786, e-ISSN: 2394-0794, Volume 6, Issue 3; April-June, 2019, pp. 122-126

http://www.krishisanskriti.org/Publication.html

ASSESSING THE LEVEL OF ADOPTION OF IMPROVED COWPEA PRODUCTION TECHNOLOGIES AMONG FARMING HOUSEHOLDS IN MOYAMBA DISTRICT, SIERRA LEONE

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Abstract—*Many Cowpea technologies have been developed in the past, but the level of adoption of these technologies and how they are used by resource-poor farmers is a major concern. The study was therefore conducted to determine the level of adoption of improved Cowpea Production Technologies among Farming Households in Moyamba District. Hypotheses were, "there is no significant relationship between farmer's background, access to extension services and their adoption of improved cowpea varieties". The study was conducted in Moyamba District and a survey research design was adopted. A simple random sampling technique was used to elicit information from 120 farmers. Data were analyzed by simple descriptive analysis, simple linear regression model using SPSS version 16.*

Major findings reveal that 63.33 % of the respondents were within the active age range of 21- 40 years. There were more male cowpea farmers (70.83 %) than female cowpea farmers (29.17 %). Majority of the respondents (73.30 %) were married and 15.80 % of the respondents were single. Half of the respondents (50.80%) were illiterate and 23.30% of the respondents had secondary education. Majority of the respondents (89.2%) had their income from farming. More than half of the respondents (54.6%) got information on improved cowpea production technologies from SLARI scientist. Almost all the cowpea production technologies disseminated to farmers were highly adopted and majority of the respondents (99.00 %) adopted the "time of planting". Major factors influencing the adoption of improved cowpea technologies include; frequent extension visit and training of farmers. These had a positive relationship with the adoption of improved cowpea technologies. Major constraints faced by farmers were pests and disease, difficulty in accessing improved seeds, and no access to credit for cowpea production. It was recommended that extension contact should be improved and active participation of women and young farmers.

1. INTRODUCTION

Cowpea (Vignaunguiculata (L.) is a yearly grain legume native of tropical Africa (Padulosi and Ng, 1997). It is the most widely cultivated grain legume in Africa. In West Africa, legumes particularly cowpea are of major importance in the livelihood of millions of comparably poor people. This accounts for about 80% of the total dietary protein intake for adults and is essentially the only source of protein for most children (Anazonwu-Bello, 1976).

In Sierra Leone, Cowpea is the second most important grain legume after groundnut. The grain is highly desired for its nutritive content and short cooking duration. Most farmers prefer it because of its ability to maintain soil fertility by fixing nitrogen into the soil (Mansaray and Moseray 2014).

Many cowpea production technologies have been developed since it's an important crop in Sierra Leone and West Africa as a whole. Work is still going on to enhance the Cowpea product value chain. However, little information is available as to how these technologies have been adopted and are used by resource-poor farmers. New technologies require intensive management and information. Therefore, farmers with low literacy rate in developing countries, inadequate extension services, and poor physical infrastructures face a great challenge in adopting new technologies. This hinders them from exploiting the full potential of the technologies (Ali and Byerlee, 1991; Pingali and Heisey, 1999). While measures have been taken to maintain high rate of adoption of new crop varieties, little or no effort has been put on the adoption of other types of complementary information, which together forms the best-practice technological package (Kalirjan, 1999); Kalirjan and Shand, 2001; Pingali and Heisey,1999).

The overall purpose of this study was to assess the level of adoption of improved cowpea production technologies in Kowa Chiefdom. The study was specifically designed to ascertain the socio-economic characteristics of the farmers in the study area, determine the level of adoption of improved cowpea technologies, assess the factors influencing the adoption of improved cowpea technologies, and to know the constraints faced by farmers' in the adoption of improved cowpea technologies. The authors believe that the study will give an overall view of the rate of adoption of the cowpea technologies and factors responsible for non-adoption or rejection of technologies. This will serve as a guide for further intervention to improve the cowpea value chain in Sierra Leone. The hypothesis was that "there is no significant relationship between farmer's background and access to extension services and their adoption of improved cowpea variety". The alternative hypothesis was that "there is a significant relationship between farmer's background and access to extension services and their adoption of improved cowpea variety"

2. METHODOLOGY

2.1 Study Area:

This study was conducted in Kowa Chiefdom, Moyamba district, Southern Province of Sierra Leone in the year 2014. Moyamba district borders the Atlantic Ocean in the West, both Port Loko and Tonkolili districts to the North, Bo district to the East and Bonthe district to the South. Moyamba district has a population of 260,910 (Statistics Sierra Leone, 2004). Its capital and the largest city is Moyamba. The district is the largest in the Southern province by geographical area, occupying a total area of 6,902 km2 (2,665 sq miles) and comprises of fourteen chiefdoms. The majority (over 92%) of the district population resides in rural areas. The average family size is 5.7.

The main economic activities include mining (rutile and bauxite), fishing, rice growing and oil palm production. Agriculture remains the mainstay of the District residents and the largest sector of the economy in the district, providing livelihoods for over 71% of the population. Crops grown in the district include oil palm, cereals (maize, rice, sorghum and millet), tuber crops (yam, cassava and cocoa) and legumes (groundnut soya bean and cowpea)

2.2. Population sample and sample procedure:

The population for this study comprises of all cowpea farmers in Kowa chiefdom, Moyamba district. Multi-stage sampling technique was used to select respondents for this study. Three villages were randomly selected using simple random techniques. In each of the selected villages, 40 farmers were randomly selected from a list of cowpea farmers and were interviewed, thus making a sample size of 120 farmers for the study.

2.3 Data collection:

Data were collected through the use of an interview schedule. A survey questionnaire was used to obtain information from the farmers on their socio-economic characteristics, the level of adoption of improved cowpea technologies, factors influencing the adoption of improved cowpea technologies, and the constraints faced by farmers' in the adoption of those technologies. Data were analyzed using simple descriptive statistics, simple linear regression model using SPSS version 16.

3. RESULTS AND DISCUSSIONS

3.1 Socio-economic characteristics:

Results from Table 1 reveal that the age ranged from 20 to 65 years with a mean age of 38.2 years. Majority of the respondent (63.33 %) were within the active age range of 21-40 years, 30 % of the respondents were within the age range of 41-60 years, 5.00 percent of the respondents were within the age range 61 – 80 years, and 1.67 % of the respondents were below 20 years. There were more male cowpea farmers (70.83 %) than female cowpea farmers (29.17 %). Majority of the respondents (73.30 %) were married, 15.80 % of the respondents were single, 8.30 % of the respondents were widows, and 2.50 % of the respondents had divorced. Half of the respondents (50.80%) were illiterate and 23.30% of the respondents had secondary education. Those who had primary education accounts for 19.20 % and 5.00% of the respondents had tertiary education. Only 1.60 % of the respondents had an Arabic education. More than three-fifths of the respondents (67.00 %) were heads of households whereas 33.00% of the respondents were not members of households, but dependants of household heads.

More than two-fifths of the respondents (44.20 %) had 4-6 household members, 25.00 % of the respondents had 7-9 household members, 13.00 % of them had 10-12 household members and 8.00 % had 13 above household members. This showed that all the houses had more than one household. Majority of the respondents (89.20 %) had their income from farming, 5.00 % of the respondents got their income from a business. Only 4.20 % of the respondents got their income from teaching and 0.80 % of the respondents got their income from tailoring

Table 1. Socio economic characteristics of respondents

Variables	Frequency (N=120)	Percentage (%)	Mean
Age (years)			
Up to 20	2	1.67	
21– 40	76	63.33	38.2
41 – 60	36	30.00	
61 – 80	6	5.00	

Gender			
Male	85	70.83	
Female	35	29.17	
Marital status			
Married	88	73.30	
Single	19	15.83	
Divorce	3	2.50	
Widow	10	8.33	
Educational status			
None	61	50.80	
Primary	23	19.20	
Secondary	28	23.30	
Tertiary	6	5.00	
Arabic	2	1.60	
Household size			
1-3 Household	9	7.50	
4-6 Household	53	44.20	
7-9 Household	30	25.00	
10-12 Household	19	15.00	
13 And above	9	7.50	
Main source of income			
Farming	107	89.2	
Tailoring	1	0.8	
Business	6	5.00	
Builder	1	0.80	
Teaching	5	4.20	
Source of information			
Extension agent	5	4.17	
MAFFS	6	5.00	
SLARI	65	54.17	
Farmers	44	36.67	

Source: Field survey

and building. This is an indication that most of the people in that study area were farmers even though there are other sources of economic activities referred to as off-farm income generating activities.

More than half of the respondents (54.17 %) got information on improved cowpea production technologies through SLARI scientists, 36.67 % of the respondents got their information through farmer to farmer contact. Only 5.00 % of the respondents got information from MAFFS and 4.17 % of the respondents got information from extension agents.

3.2. Adoption Level of Improved Cowpea

Production Technologies: Majority of the respondents (99.00 %) adopted the "time of planting", this was followed by "land preparation" (95.00 %), "Planting space" (93.00 %), "number of times to weed" (93.00 %), " number of seeds per hole"(86.00 %), "improved variety" (82.00 %), This showed that most of the technologies were highly adopted by the farmers in the study area (Figure 1 below).

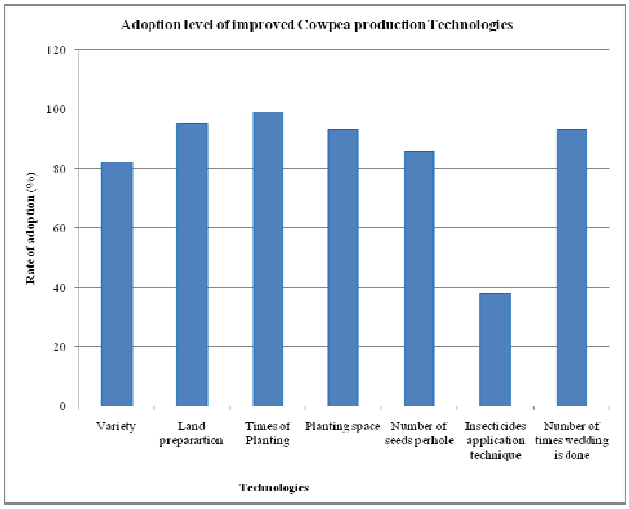

Figure 1. Adoption level of improved Cowpea production Technologies

3.3. Determinants of Adoption of Improved Cowpea Production Technologies:

Results from Table 2 reveal that access to extension services and frequent extension training had a significant relationship with the adoption of improved cowpea variety. On the other hand, gender did not have any significant relationship with adoption of improved variety. This agrees with the findings of Doss and Williams (1999).It has been observed in Ghana that gender-linked differences in the adoption of modern maize varieties and chemical fertilizers are not due to innate characteristics of the technologies but emanate from gender-linked differences in access to key inputs (Morris and Doss, 1999).Age of the farmers showed no significant relationship with the adoption of improved cowpea variety. On the other hand, the impact of farmer's age on technological adoption is less clear. Long farming experience is expected to affect adoption positively, and the likelihood of younger farmers to invest in new technologies (Lapar and Pandey, 1999).

The academic status of the respondents had no significant relationship with adoption of improved cowpea variety. This does not agree with the findings of Abd El-Razek (2002) who had a significant positive relationship between education and adoption. Membership of association of the farmer had no significant relationship with the adoption of improved cowpea variety.

According to the study, the perception of the farmers about improved cowpea variety had no significant relationship with the adoption of the variety. The number of times visited by an extension agent had high significance relationship with adoption of improved cowpea variety. This implies that regular contact with extension provides an opportunity for transfer of skill, knowledge and information which facilitate the adoption of improved variety.

Table 3.Constraints Faced by Farmers in Adoption of improved cowpea technology

Constraints	Frequency	Percentage (%)
Financial problem	25	20.83
Pest and disease problem	28	23.33
Health constraints	6	5.00
Tools problem	10	8.33
Labour force constraints	20	16.67
Seeds problem	25	20.83
Food problem	6	5.00

Source: Field survey

3.4. Constraints Faced by Farmers in Adoption of Improved Cowpea Technology:

Table 3 revealed that out of the seven possible constraints listed by the respondents, four were considered to be very serious in the adoption of improved cowpea production technology by the farmers. These are financial constraint (20.83 %), pests and disease constraint (23.33 %), labour force constraint (16.67 %) and seeds constraint (20.83 %). The finding is in line with the findings of Kamara et al., 2001. Also, earlier research found widespread labour constraints to farmer diversification with legumes even in relatively high population density sites of Southern Malawi (Snapp et al., 2002a). Each of these constraints has greatly influenced the adoption of the technology.

Many of the obstacles to innovation are associated with access to knowledge and technology and centre on relevance, effectiveness, and accountability of the agricultural organizations and services (World Bank 2005).

4. CONCLUSION

The study was carried out to determine the level of adoption of improved Cowpea Production Technologies among Farming Household in Moyamba District, Southern province of Sierra Leone. A simple random sampling technique was used to elicit information from 120 farmers. Data were analyzed by simple descriptive analysis, simple linear regression model using SPSS version 16. Major findings reveal that 63.33 % of the respondents were within the active age range of 21- 40 years. Mean age was 38.2 years which shows that there is an active working population in the cowpea cultivation. There were more male cowpea farmers (70.83 %) than female cowpea farmers (29.17 %). Majority of the respondents (73.30 %) were married and 15.80 % of the respondents were single. Half of the respondents (50.80%) were illiterate and 23.30% of the respondents had secondary education. Majority of the respondents (89.2%) had their income from farming. More than half of the respondents (54.6%) got information on improved cowpea production technologies through SLARI scientists. This indicates that SLARI is doing well in the dissemination of cowpea information to cowpea farmers. Almost all the cowpea production technologies disseminated to farmers were highly adopted, and majority of the respondents (99.00 %) adopted the “time of planting”. Major factors influencing adoption of improved cowpea technology include; frequent extension visit and training of farmers. These had a positive relationship with the adoption of improved cowpea technologies. However, age, sex, education, membership of an association, perception of farmers and participation in varietal selection had no significant relationship with adoption of improved cowpea variety. The non-adoption of method of application of insecticide is as a result of inaccessibility of insecticide and very expensive to afford. Major constraints faced by farmers were pests and disease, difficulty in accessing improved seeds, labour constraints, and no access to credit for cowpea production.

5. RECOMMENDATION

It was recommended that the Government and other agricultural stakeholders should make insecticides available to farmers as a basis for attaining increased and sustainable agricultural productivity. There should be a regular extension contact with farmers which provides an opportunity for transfer of skills, knowledge and information for increased adoption. Government, donor agencies and other stakeholders should provide access to finance for smallholder farmers to carry out their farm activities.

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Table 2: Determinants of adoption of improved cowpea production technologies

Variables	d Coefficients		zed Coefficients		
	B	Std. Error	Beta		
(Constant)	9.650	2.492		3.872	.000
Sex	.151	.492	.038	.308	.759
Age	.218	.173	.143	1.255	.214
Education	-.116	.232	-.062	-.500	.619
Membership of association	-.326	.445	-.087	-.733	.467
Type of association	-.352	.243	-.166	-1.451	.152
Perception Score	.913	2.650	.038	.345	.732
Extension agent contact	-.727	.290	-.288	-2.509	.015*
Participation in varietal selection	-.684	.419	-.188	-1.634	.107
Training attended	-.647	.320	-.239	-2.020	.048*
a. Dependent Variable: ADPOTION SCORE					

Source: Field survey